

*THERMAL PRINTER*

# *TSP200 Series*

***TECHNICAL MANUAL***

[SECOND EDITION]

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# INTRODUCTION

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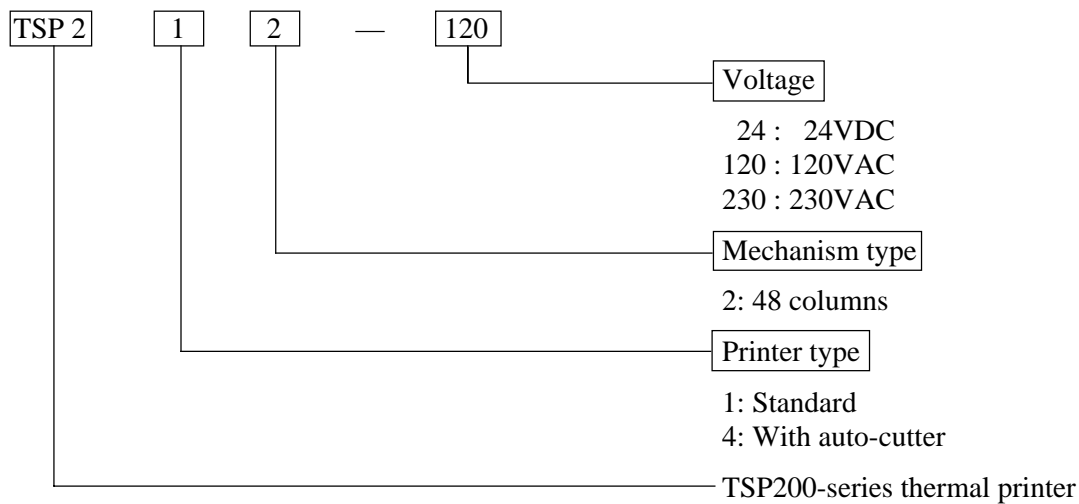
This manual describes the thermal printer TSP200 series.

It is designed for use as a reference for periodic inspections and maintenance procedures to be executed by service personnel. It is not intended for the general user. Users of this manual should have a basic knowledge and understanding of the English language.

- This manual is comprised of the following chapters.
  - Chapter 1 Specifications and Operation
  - Chapter 2 Theory of Operation
  - Chapter 3 Parts Replacement and Related Adjustments
  - Chapter 4 Maintenance and Lubrication
  - Chapter 5 Parts Lists

- First edition : Mar. 1997
- Second edition : Aug. 1999

## ■ Model Name





# CHAPTER 1

## SPECIFICATIONS AND OPERATION

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## 1. General Specifications

Printing method	Line thermal direct
Resolution	8 dots/mm (H) × 8 dots/mm (V)
Printable width	72 mm
Printing speeds	50 mm/sec (max.)
Printable characters	ANK, International
Bar codes	JAN, EAN, UPC, Code 39, ITF, Code 128, Code 93, NW-7
Character matrix	12 × 24 dots
Interfaces	RS-232C, Parallel
Dimensions	TSP212-120/230 : 158(W) × 234(D) × 193(H) mm TSP242-120/230 : 158(W) × 234(D) × 193(H) mm TSP212-24 : 158(W) × 239(D) × 193(H) mm TSP242-24 : 158(W) × 239(D) × 193(H) mm
Weight	TSP212-120/230 : 2.8kg TSP242-120-230 : 3.0kg TSP212-24 : 1.8kg TSP242-24 : 2.0kg AC adapter : 350g AC cable : 150g
Power	AC120V, AC230V, DC24V
Power consumption	Max. 43 W Avg. 19W (During continuous printing of ASCII characters)
Operating environment	+5°C ~ +40°C 25% ~ 85% RH
Storage environment	-20°C ~ +60°C 10% ~ 90% RH
Automatic paper cutter	
Life	300, 000 cuts
Min. cut length	25.4mm (1 inch)

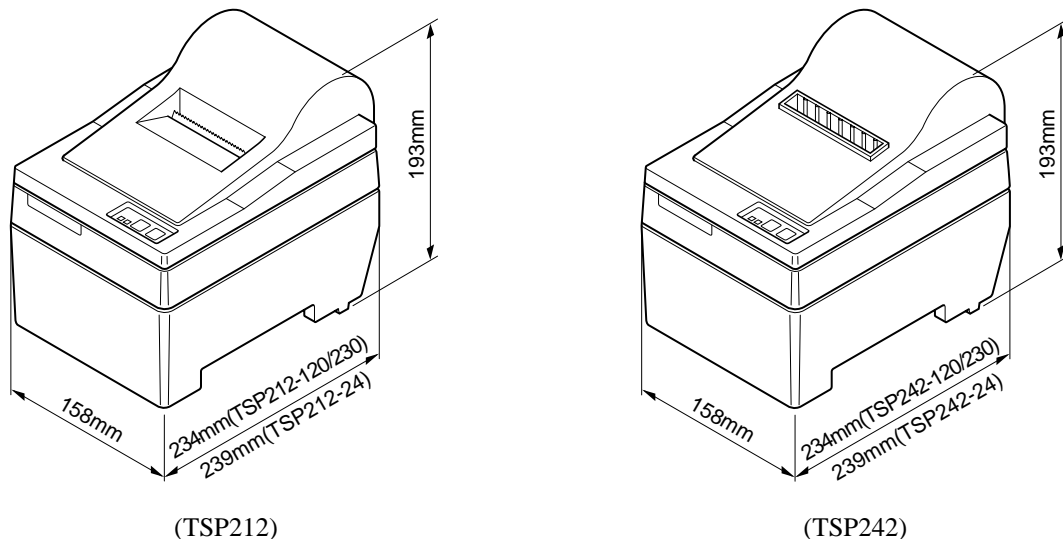


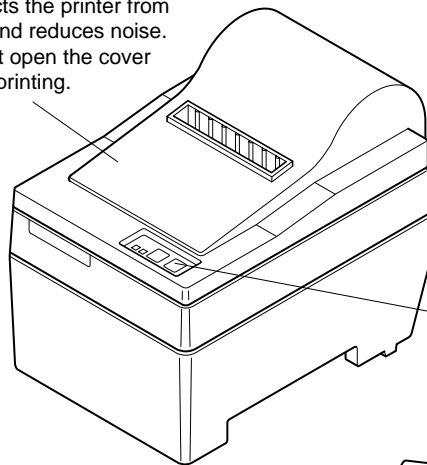
Fig. 1-1 External Dimensions

## SPECIFICATIONS AND OPERATION

### 2. External Appearance

**Printer cover**

Protects the printer from dust and reduces noise. Do not open the cover while printing.

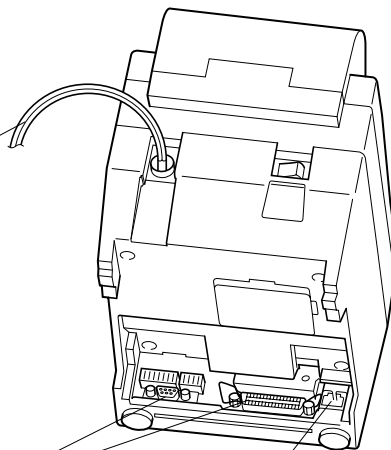


**Control panel**

Features two control switches and two indicators to indicate printer status.

**AC power cord**

Plugs into an outlet of the specified voltage. Shape of AC power plug will vary according to destinations.



[ TSP200-120/230 ]

**Interface connector**

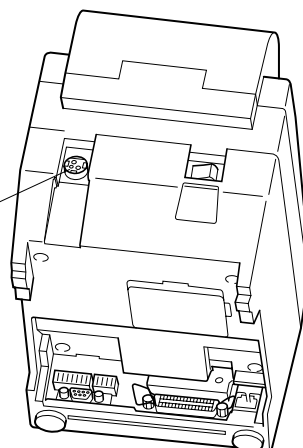
Connects the printer with host computer.

**Peripheral unit drive circuit connector**

Connects to peripheral units such as cash drawers, etc. Do not connect this to a telephone.

**AC adapter cable connector**

For connection of the AC adapter. Never unplug the AC adapter while the printer is on.



[ TSP200-24 ]

Fig. 1-2 External Appearance



### 3. DIP-Switch Settings

Be sure to turn the power to both the printer and host computer off before changing the setting of the DIP switches.

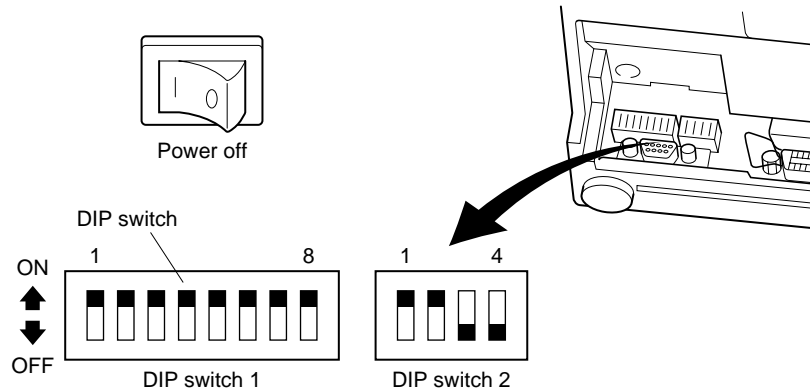


Fig.1-3 DIP switch array

#### DIP switch #1

The factory settings of DIP switch 1 are all on.

Switch	Contents	ON	OFF
1-1	Baud Rate		
1-2			
1-3	Data Length	8 bit	7 bit
1-4	Parity Check	Disabled	Enabled
1-5	Parity Selection	Odd	Even
1-6	Handshake	DTR/DSR	XON/XOFF
1-7	Operating Mode	Star	ESC/POS
1-8	Interface	RS232C	Parallel

Baud Rate	1-1	1-2
2400BPS	OFF	OFF
4800BPS	ON	OFF
9600BPS	ON	ON
19200BPS	OFF	ON

#### DIP Switch #2

Factory settings: 2-1 and 2-2 are on; 2-3 and 2-4 are off.

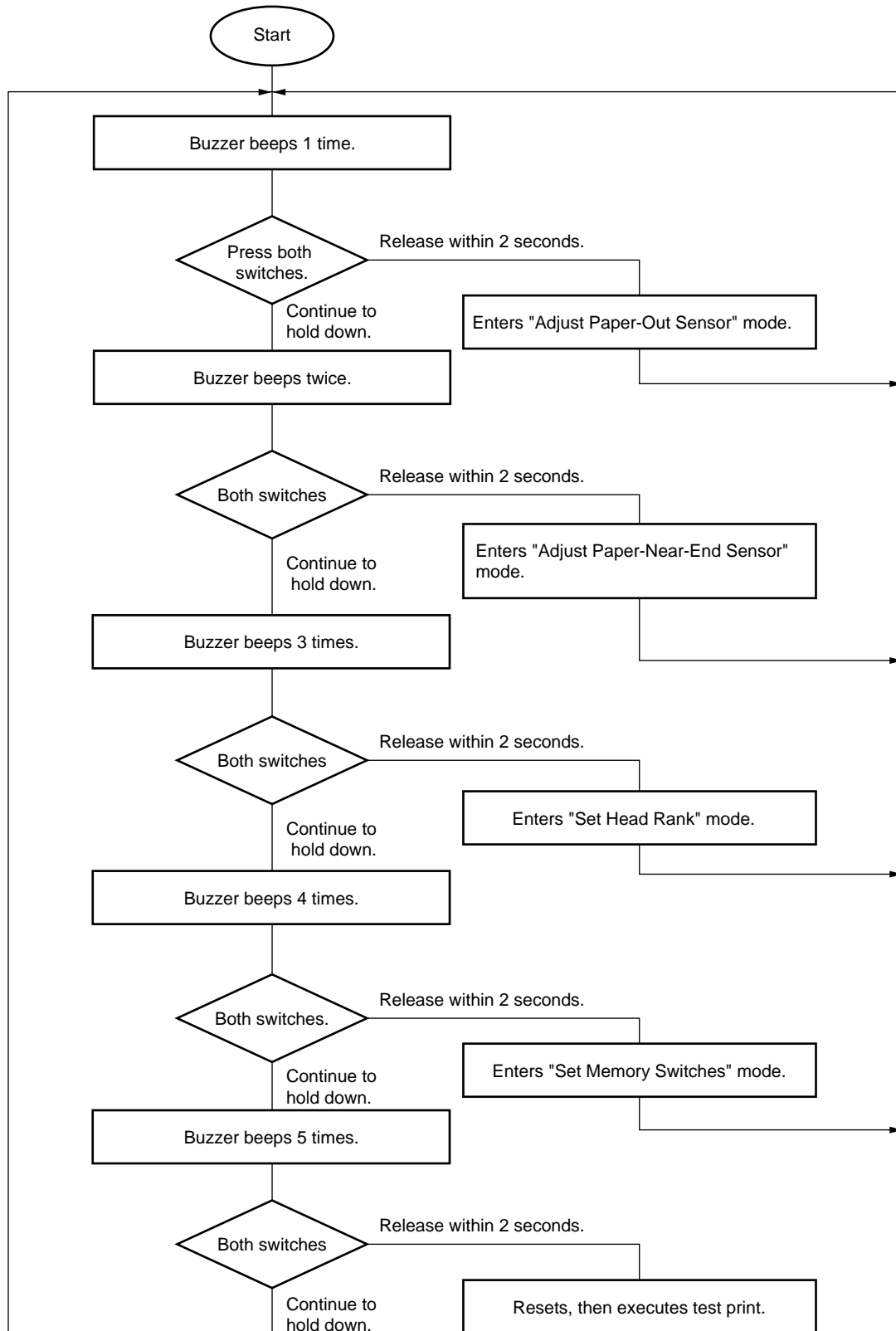
Switch	Contents	ON	OFF
2-1	Print Density		
2-2			
2-3	Serial I/F No. 6 Pin Reset Signal	Enabled	Disabled
2-4	Serial I/F No. 9 Pin Reset Signal	Enabled	Disabled

Print Density	2-1	2-2
Light	OFF	OFF
Standard	ON	ON
Somewhat Heavy	ON	OFF
Heavy	OFF	ON

## SPECIFICATIONS AND OPERATION

### 4. Using the control panel to adjust the sensors, select the head rank, and set the memory switches.

Hold down the FEED and ONLINE switches while setting power on, then continue to hold the switches down for the time necessary to enter the required mode, as indicated below.



(1) “Adjust Paper-Out Sensor” mode.

Adjustment is not necessary if the ONLINE lamp is ON when you enter this mode. If the lamp is OFF, the turn VR1 clockwise until it the lamp comes ON.

To exit this mode, press ONLINE. To move back to the start of the sequence, press both ONLINE and FEED at the same time.

Please be sure that paper is inserted before entering this mode.

(2) “Adjust Paper-Near-End Sensor” mode

When you enter this mode, the POWER lamp will be lit if the near-end sensor is detecting paper. The lamp will be off if no paper is detected.

To exit the mode, press ONLINE. To move back to the start of the sequence, press both ONLINE and FEED at the same time.

(3) “Set Head Rank” mode

When you enter the mode, the ONLINE and POWER lamps will both be OFF. Press the FEED switch as necessary to select the desired rank. The rank is indicated by the ONLINE and POWER lamp pattern, which changes each time you press the switch. The change sequence is indicated below. (Note that you can move back to the start of the sequence by pressing the ONLINE and FEED switches at the same time.)

ONLINE lamp	FEED lamp	Head Rank
OFF	OFF	A
OFF	ON	B
ON	OFF	C
ON	ON	C

(4) “Set Memory Switches” mode

- ① When you first enter this mode, memory switch 0 is selected. You can change the selection by pressing FEED as many times as necessary. Specifically, the selection cycle is 0 -> 1 -> 2 -> 3 -> 4 -> 0 -> 1 ->... In other words, press 0 times to select Switch 0, 1 time to select Switch 1, and so on.
- ② Press ONLINE once to confirm your selection. The buzzer beeps one time in response.
- ③ Set a value for each bit in turn, starting from Bit F and proceeding sequentially to Bit 0. Note that the lamps indicate each bit's current value: ONLINE lamp ON means that the current value is “1”, while POWER lamp ON means that the current value is “1”.  
To set to 0: Press FEED. (The buzzer will beep once.)  
To set to 1: Press ONLINE. (The buzzer will beep once.)  
When you complete setting of Bit 0, the buzzer will beep again.
- ④ When you have set all bit values and are ready to enter the new value, press the ONLINE switch. The buzzer beeps once and the value is written to memory.  
If you wish to cancel your changes, press the FEED switch instead. The buzzer will beep twice and the process will return to the beginning of Step (3) above.
- ⑤ Press the ONLINE and FEED switches at the same time to move back to the start of the sequence.

## **SPECIFICATIONS AND OPERATION**

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### **5. Running a test print**

To generate a test print, hold down the FEED switch while setting the power on.

### **6. HEX dump mode**

To enter HEX dump mode, hold down the ONLINE switch while setting the power on, and then release the switch after the buzzer beeps once.

When this mode is active, all data sent from the host will be printed in HEX form.

## CHAPTER 2

# PRINCIPLES OF OPERATION

This chapter describes the operating principles of the circuitry and printer mechanism.

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1. Block Diagram

The following diagram illustrates the relation between the main logic board and its peripherals.

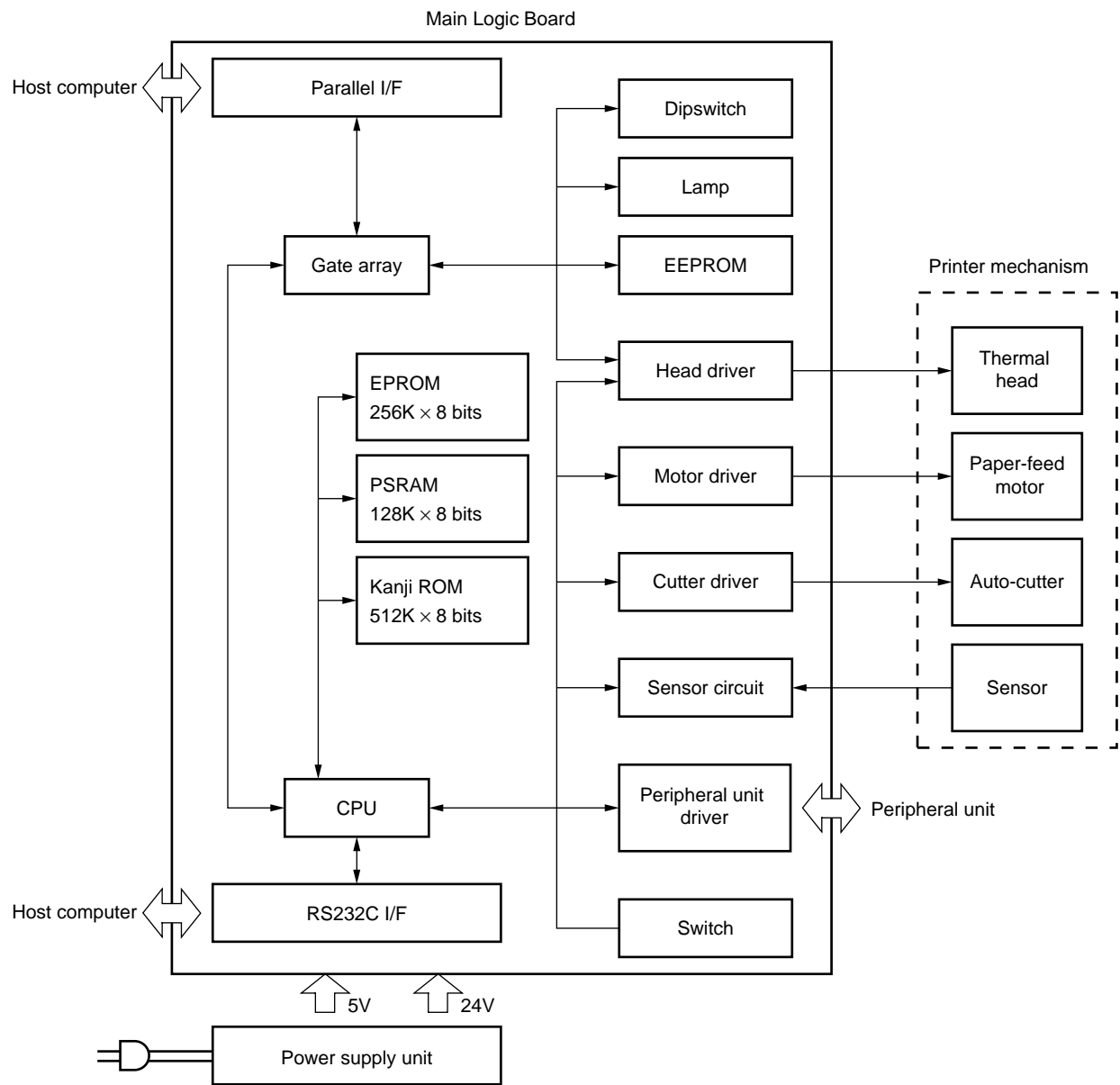


Fig. 2-1 Block Diagram

## PRINCIPLES OF OPERATION

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### (1) Main Logic Board

The main logic board's CPU passes data transmitted from the host computer into the local RAM. It then reads the data from the RAM, arranges it in accordance with the ROM program, and prints the results by issuing appropriate drive signals to the printer mechanism.

[Block Descriptions]

- a. CPU: HD6413002F16  
CMOS single-chip computer.  
Controls overall printer operation.
- b. EPROM: 256K × 8 bits  
Stores the CPU control program.
- c. PSRAM: 128K × 8 bits  
Work area and data buffer.
- d. EEPROM: 1024 bits  
Stores printer settings. Settings can be changed by software. (Used in place of dip switches.)
- e. Interface  
Interfaces the main board with the host computer.  
Two versions available: RS232C and Centronics.
- f. Gate array  
Handles signal input, output, and conversions.
- g. Drivers  
The various drivers convert signals received from the CPU and gate array into drive signals that directly control the printer mechanism.

### (2) Printer Mechanism

Comprised of thermal head, platen, paper-feed motor, auto-cutter, and sensor mechanism.

### (3) Power Supply Unit

Converts primary power to DC5V, DC24V.

### (4) Peripheral Unit

External device (such as cash drawer) driven by signals issued from the main logic board.



## 2. Interface

### 2-1. Interface Types

#### 2-1-1. RS232 interface

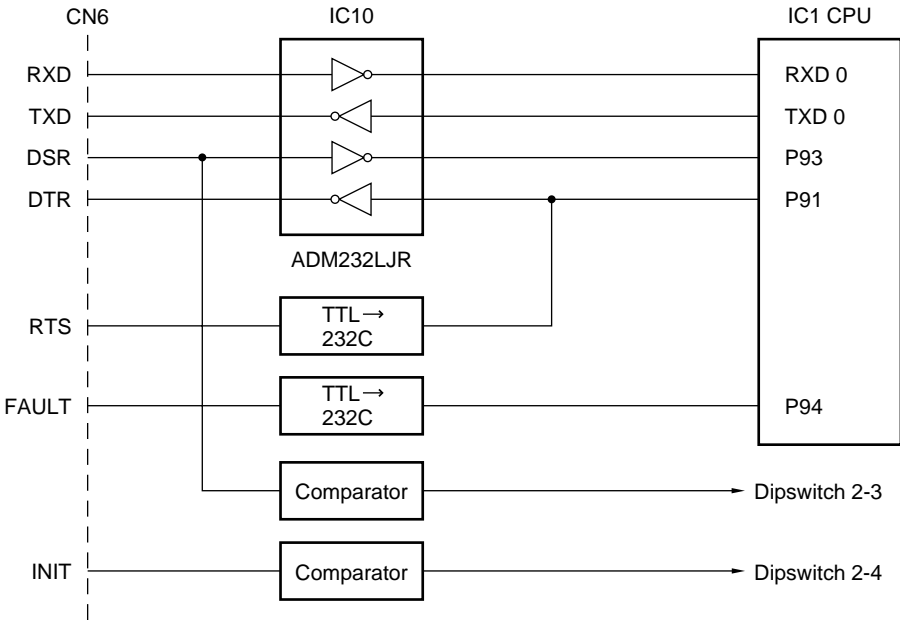


Fig. 2-2 Serial Interface

Data flow from host to printer: IC10 receives serial data from the host through RXD, converts the voltage level from RS232C to TTL, and passes the result to the CPU. The CPU converts the serial data to parallel form and stores the result into buffer memory.

Data flow from printer to host: The CPU generates the data, converts it into serial form, then passes it to IC10. IC10 converts the level from TTL to RS232C and outputs the result over the TXD line.

## PRINCIPLES OF OPERATION

### 2-1-2. Parallel interface

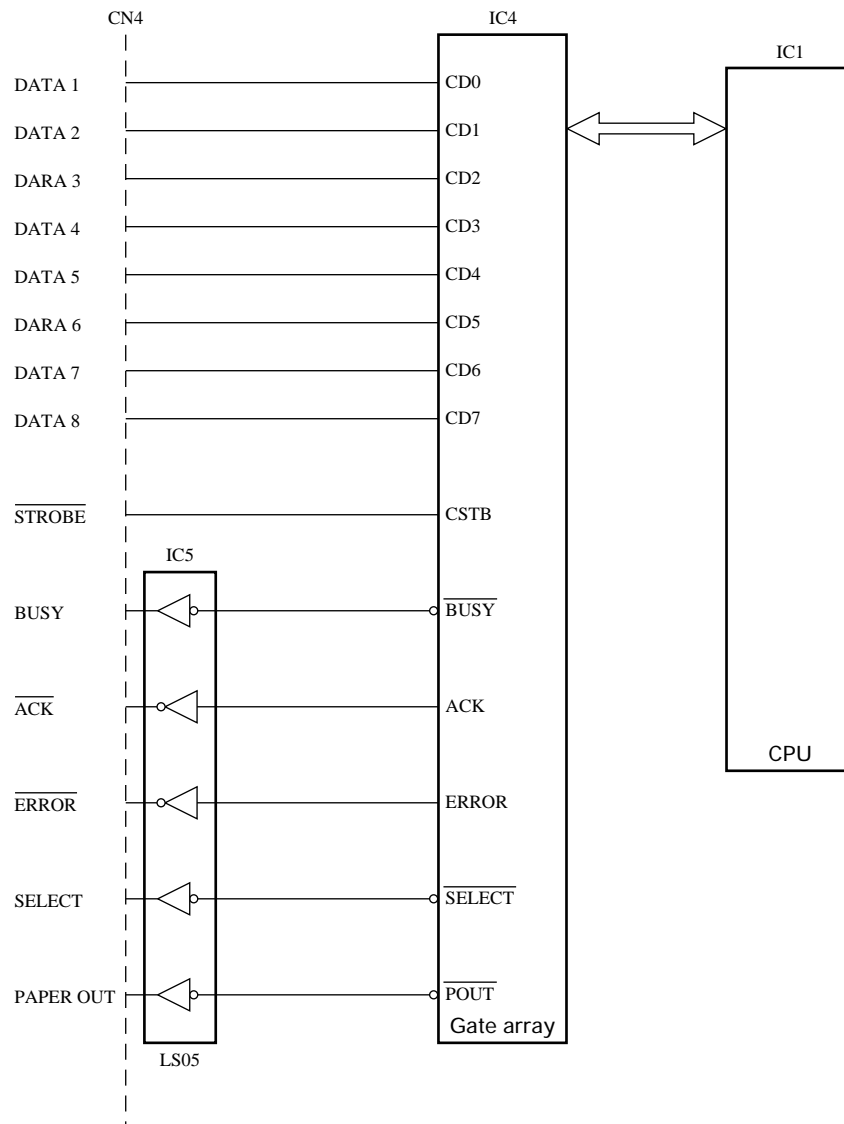


Fig. 2-3 Parallel interface

When the printer is ready (BUSY is LOW), the host computer transmits eight bits of parallel data (DATA1,...,DATA8) to CN4. The data passes through the gate array and moves into the CPU.

Printer signals from the CPU (ACK, ERROR, SELECT, PAPER OUT, etc.) pass through the gate array and are output over the appropriate connector pins.

## 2-2. Data Arrangement and Printing

### 2-2-1. Arrangement

The CPU reads data sequentially from RAM and arranges this data in accordance with program instructions stored in EPROM. The arranged data is then converted from parallel to serial form. The gate array then outputs the resulting serial data to the drive controller in the thermal printhead.

### 2-2-2. Thermal printhead

The thermal printhead has 576 heat elements. Printing is executed by switching these elements ON and OFF as required. The printhead contains a built-in dedicated drive controller. The controller consists of shift register, latch circuit, and driver circuit, as illustrated below. The controller receives serial data (SI) from the gate array in sync with the CLK signal. It latches this incoming data (by LATCH signal), then outputs the data to the elements in sync with the falling edge of the STROBE signal. A data value of LOW corresponds to an element value of ON (generating print).

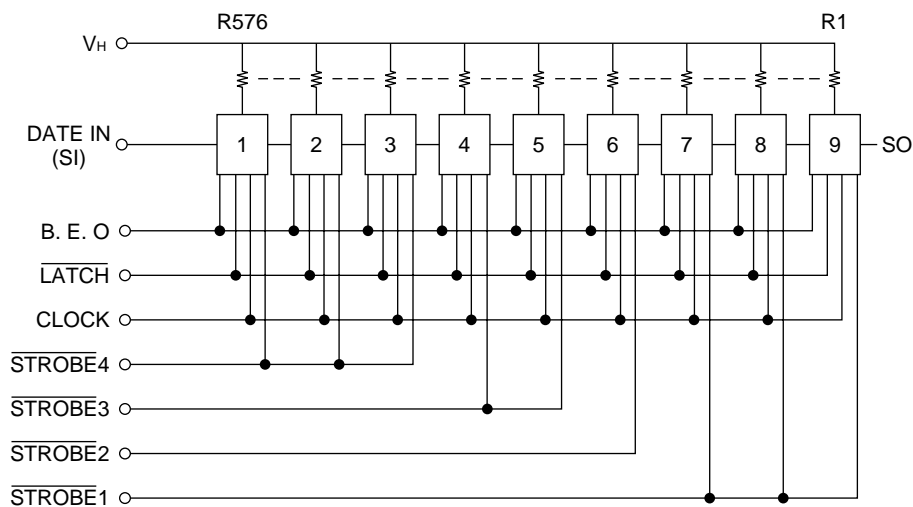


Fig. 2-4 Drive Circuitry of Thermal Printhead

## PRINCIPLES OF OPERATION

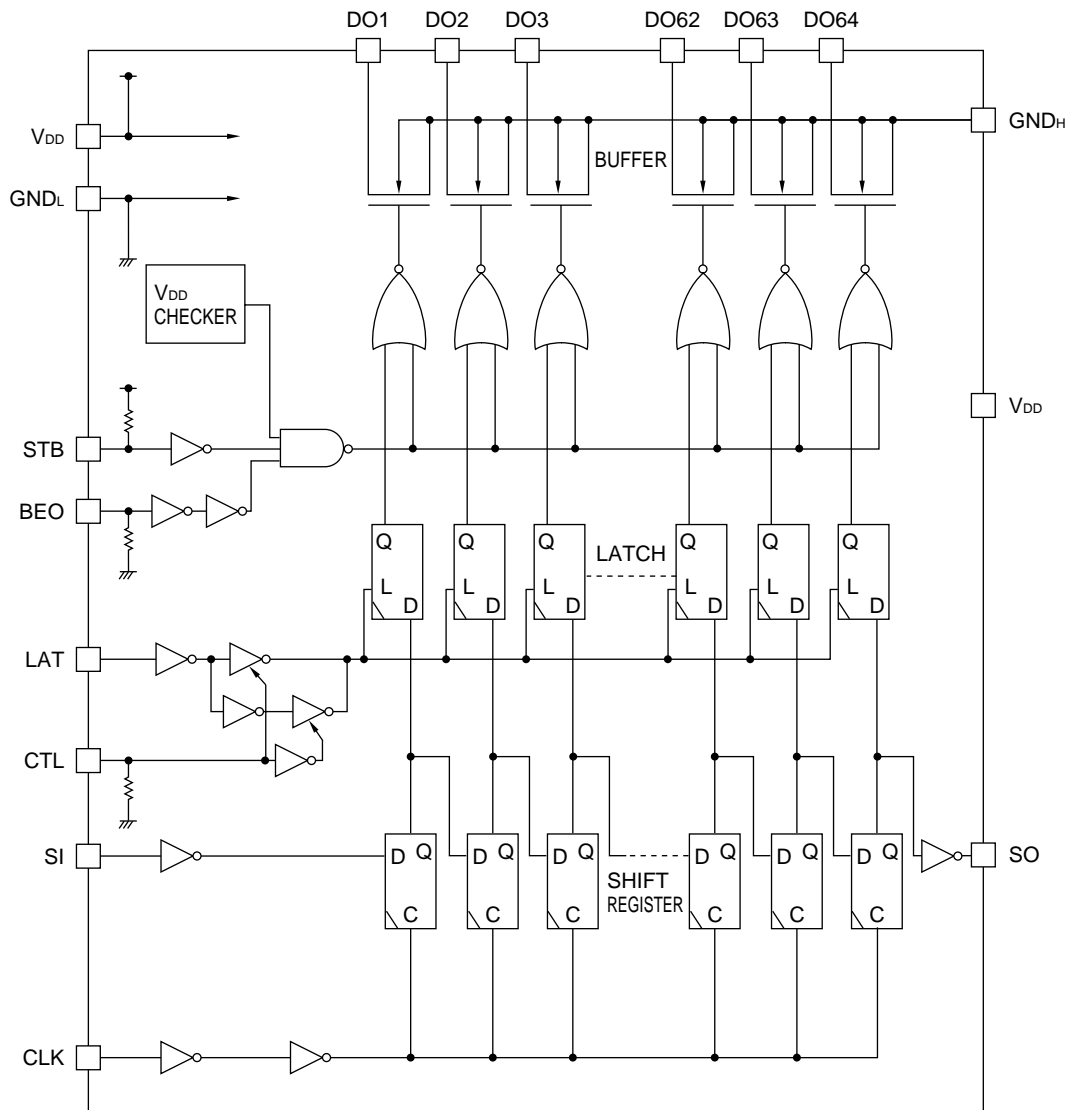


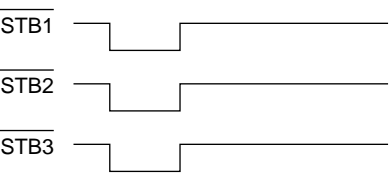
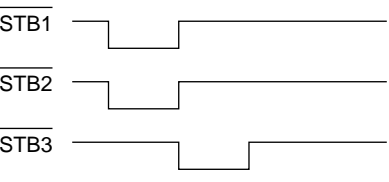
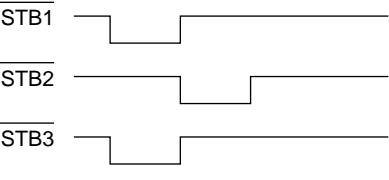
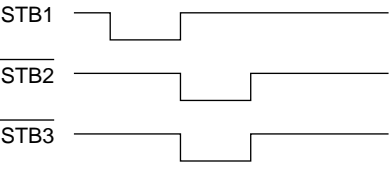
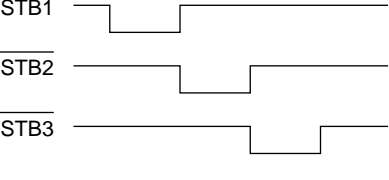
Fig. 2-5 Block Diagram of Drive IC

### 2-2-3. Head current control

Although the thermal printhead has four different STROBE lines, in fact it uses only three strobe signals to control its 576 elements. Specifically, each signal drives 192 of these elements. The signal/element arrangement is shown below.

Thermal Printhead	Elements	Strobe Signal
$\overline{\text{STROBE1}}$	1 – 192	$\overline{\text{STB1}}$
$\overline{\text{STROBE2}}$	193 – 256	$\overline{\text{STB2}}$
$\overline{\text{STROBE3}}$	257 – 384	$\overline{\text{STB3}}$
$\overline{\text{STROBE4}}$	385 – 576	$\overline{\text{STB3}}$

Strobe signals are output in one of five patterns, depending on the number of dot lines that are simultaneously ON. The following table shows each of the patterns. Figure 2-7 shows the timing for Pattern (5).

Number of ON Elements per Dot Line	Strobe Signal Output $\overline{\text{STB1}}$ $\overline{\text{STB2}}$ $\overline{\text{STB3}}$	Pattern
0 $\overline{\text{STB1}}+\overline{\text{STB2}}+\overline{\text{STB3}}$ 384		①
193 $\overline{\text{STB1}}+\overline{\text{STB2}}+\overline{\text{STB3}}$ 384 $\overline{\text{STB1}}+\overline{\text{STB2}}$ 192		②
193 $\overline{\text{STB1}}+\overline{\text{STB2}}+\overline{\text{STB3}}$ 384 $\overline{\text{STB1}}+\overline{\text{STB3}}$ 192		③
193 $\overline{\text{STB1}}+\overline{\text{STB2}}+\overline{\text{STB3}}$ 384 $\overline{\text{STB2}}+\overline{\text{STB3}}$ 192		④
385 $\overline{\text{STB1}}+\overline{\text{STB2}}+\overline{\text{STB3}}$ 576		⑤

STB1: Number of ON elements in element range 1 to 192.  
STB2: Number of ON elements in element range 193 to 384.  
STB3: Number of ON elements in element range 385 to 576.

Fig. 2-6 Strobe Signal Output Patterns for Different Print Rates

## PRINCIPLES OF OPERATION

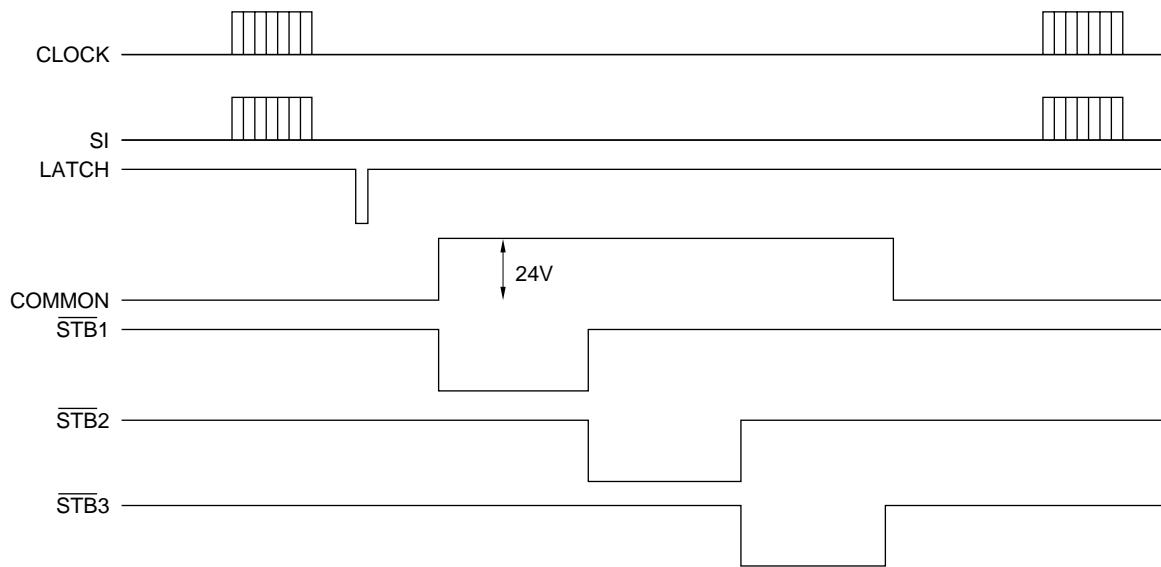


Fig. 2-7 Timing Chart

### 2-2-4. Head current control

Heat buildup in the thermal printhead can cause print quality to degrade. To maintain uniform quality, the printer varies the energizing time (time that STROBE remains LOW) in accordance with the head temperature.

The print head's surface temperature is calculated based on the resistance value of the attached thermistor, and energizing time is controlled accordingly.

### 2-2-5. Head burnout protection

Misoperation of the CPU may cause head current to remain on too long, resulting in burn damage to the elements unless current is shut off by other means. The printer therefore includes a burnout protection circuit that automatically forces current off at some fixed time  $t_w$  following current startup. Control is implemented through the head's BEO terminal, which is active on HIGH; setting the terminal LOW forces current off regardless of the STROBE state.

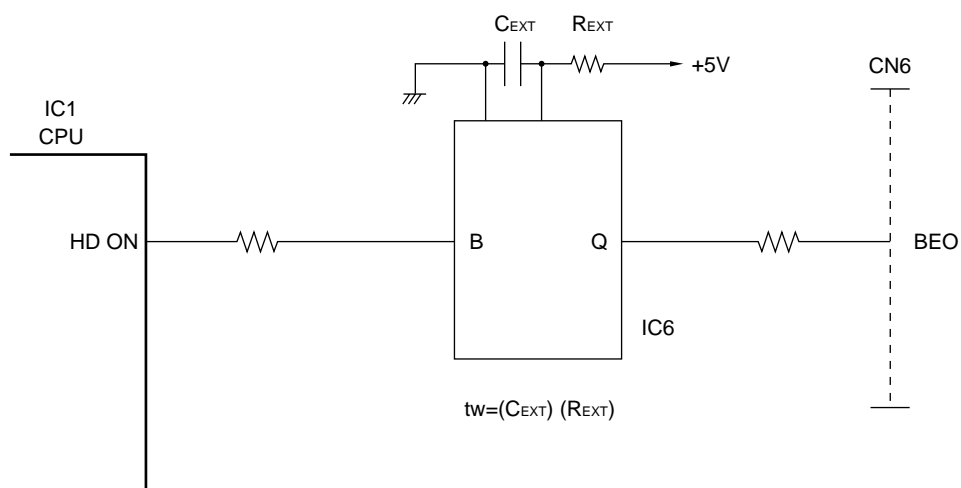


Fig. 2-8 Head Burnout Protection Circuit

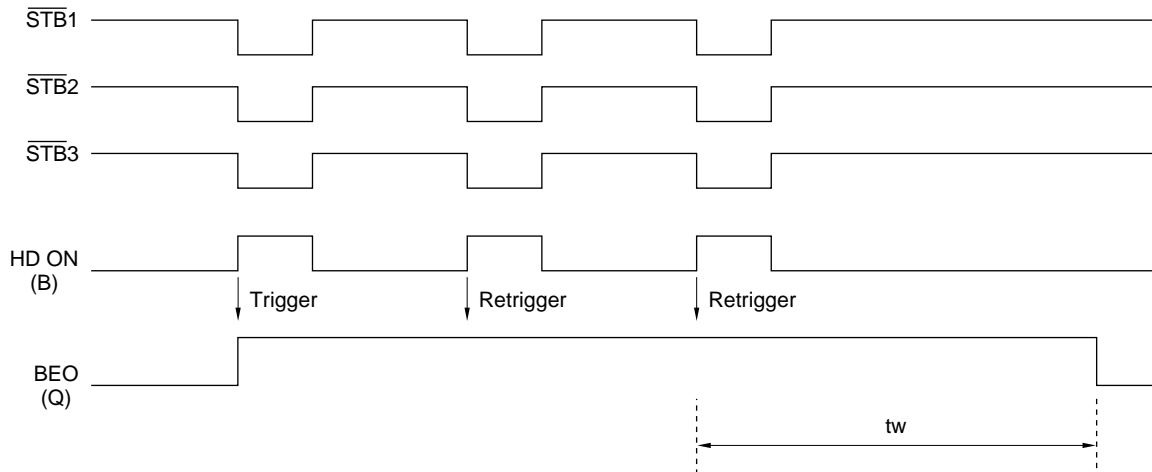


Fig. 2-9 Timing Chart

2-3. Feed-Motor Drive Circuit

The printer uses a 4-phase step motor (phase 1-2 excitation) to implement paper feed. The motor rotates through a certain angle each time it receives a pulse from the drive circuit. The following diagram illustrates the excitation method. Figure 2-11 shows the feed-motor drive circuit.

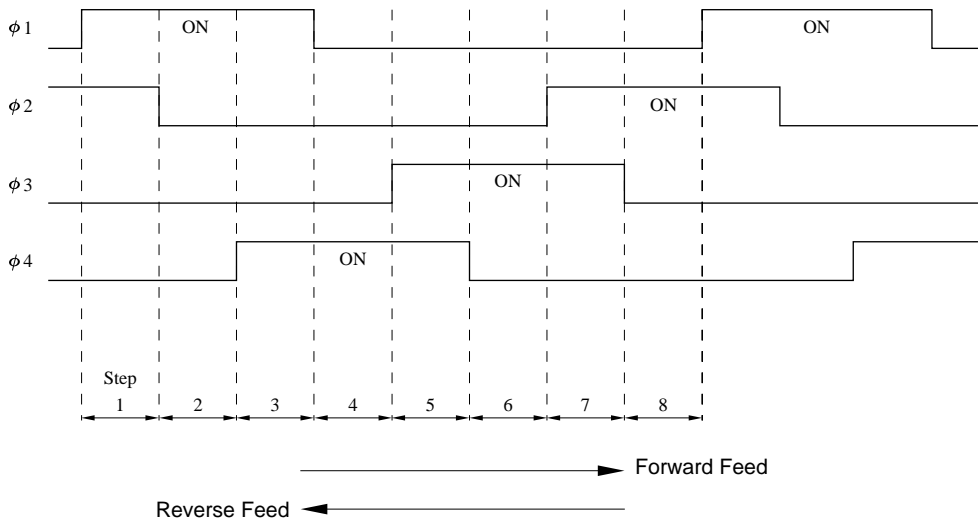


Fig. 2-10 Motor Control by Phase 1-2 Excitation

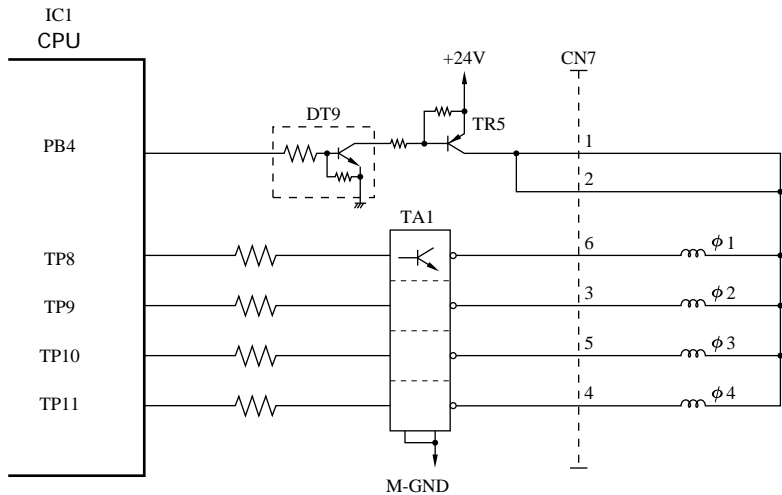
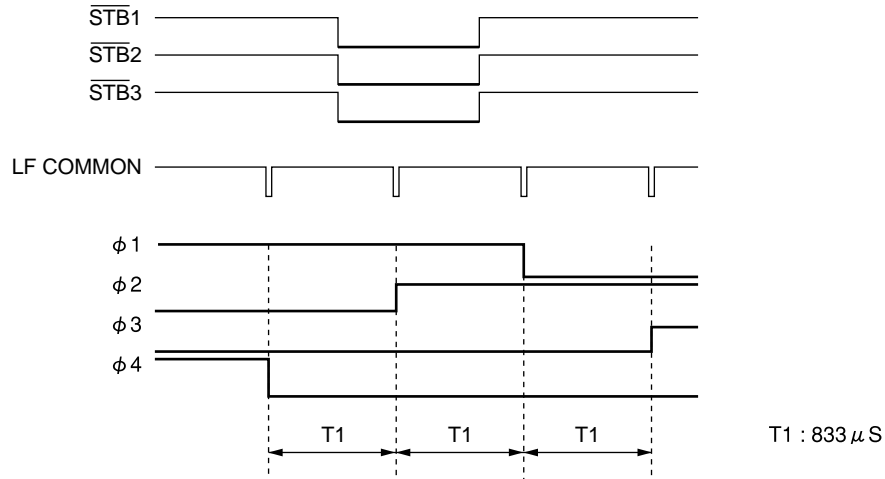


Fig. 2-11 Feed-Motor Drive Circuit

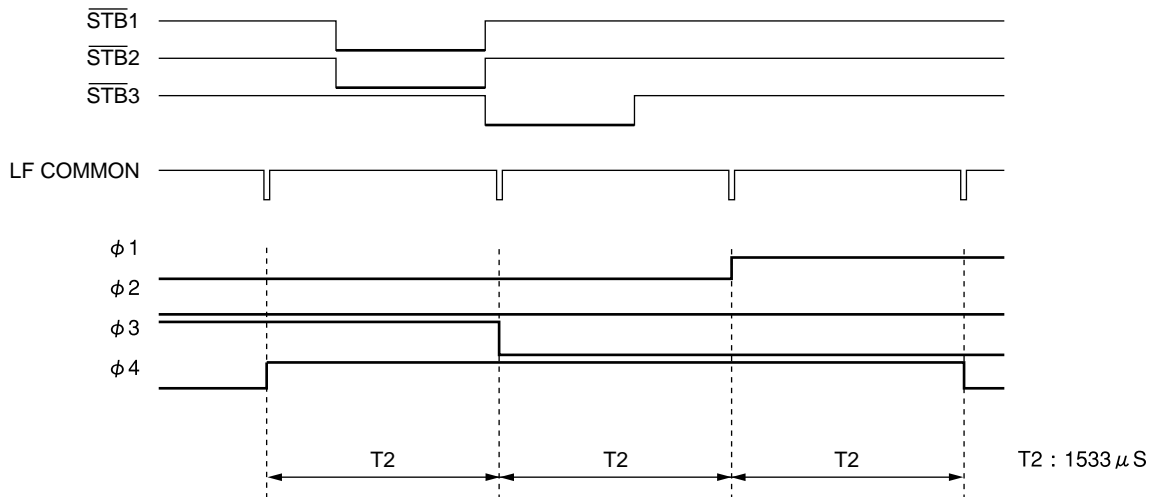
## PRINCIPLES OF OPERATION

The feed-motor pulse width varies according to the strobe output pattern (where the output pattern is determined by the print rate, as described above). The following diagram shows the pulse width for each pattern.

Pattern ①



Pattern ②



Pattern ⑤

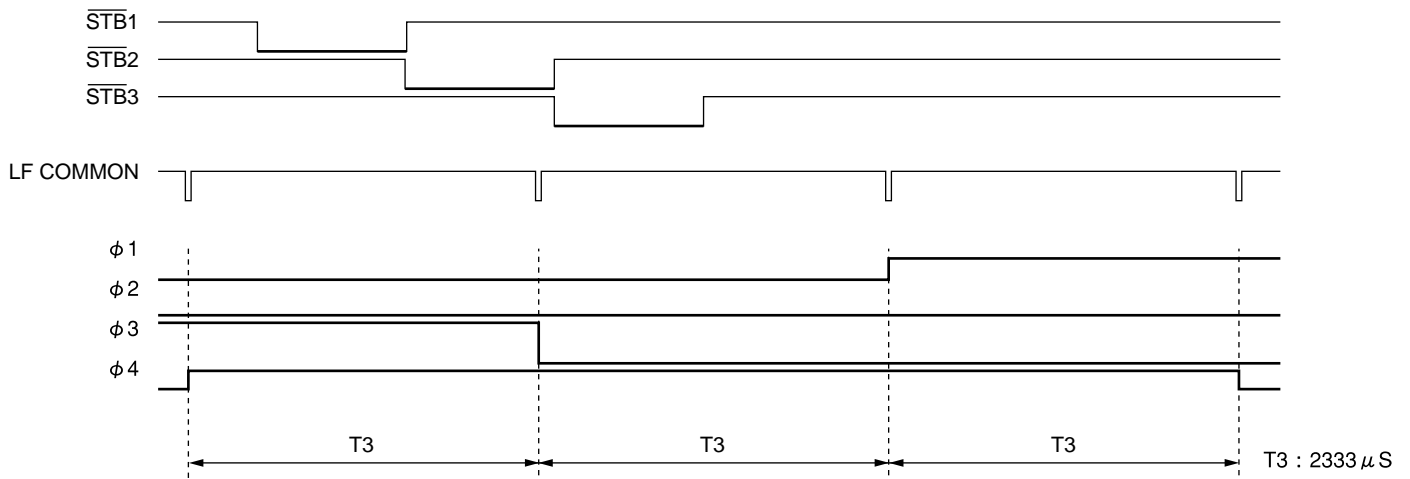


Fig. 2-12 Pulse Width by Pattern



#### 2-4. Power-On Reset Circuit

The power-on reset signal initializes all elements so as to protect against possible operating errors at power-on. The signal is held for approximately 160ms when power comes on. The reset circuit is shown below.

Fig. 2-13 Power-On Reset Circuit

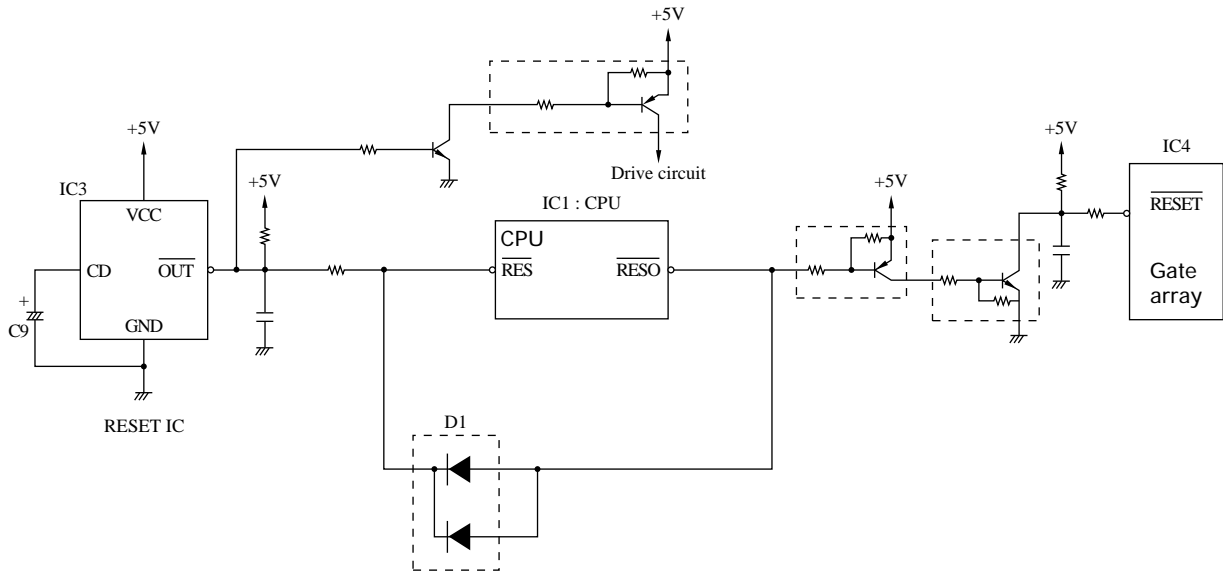


Fig. 2-13 Power-On Reset Circuit

- ① At power-on, voltage detector IC3 (M51953BL) outputs a LOW signal from its OUT terminal. The signal is held for approximately 160ms by the action of capacitor C9 (0.47μF), in accordance with the following relation:

$$T = 0.34 \times C9 \text{ (pF)} [\mu\text{s}] = 160\text{ms}$$

- ② The LOW signal generates reset of the CPU and gate array, and stops operation of the mechanism drive circuitry.

## PRINCIPLES OF OPERATION

### 2-5. +5V Line Voltage Detector Circuit

The voltage-detection IC (IC3 in Fig. 2-13) detects momentary drops or unstable levels in the +5V line voltage. The following shows an IC3-equivalent circuit.

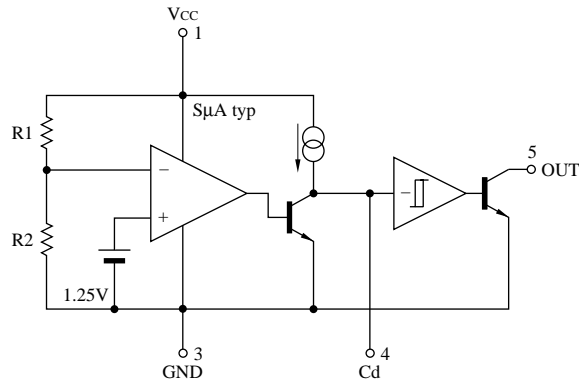


Fig. 2-14 Equivalent Circuit, Voltage Detection IC

Figure 2-15 shows the IC's operational timing. The IC asserts a reset signal at its output terminal when the +5V line voltage falls below 4.25V, thereby resetting the CPU and the gate array.

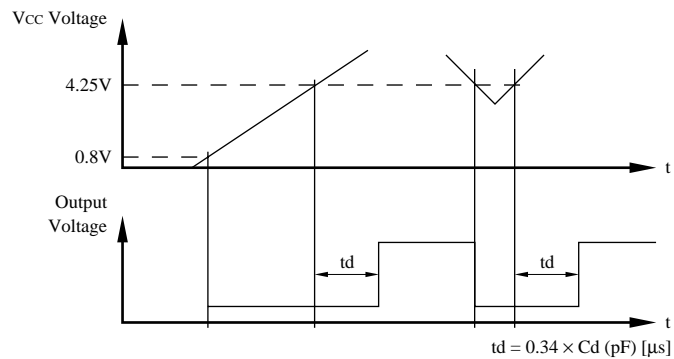


Fig. 2-15 Operation Timing Chart

## 3. Printer Mechanism

### 3-1. Thermal Printhead

The TSP400 printers utilize thermal line printing. The thermal printhead consists of a horizontal line of 576 heat elements. These elements print one line of dots at a time as the paper passes over the head. The printhead is fixed in position; only the paper moves.

The printer prints a dot by heating the corresponding heat element. The heated element generates a chemical reaction in the coloring layer of the thermal paper, resulting in the formation of a visible dot.

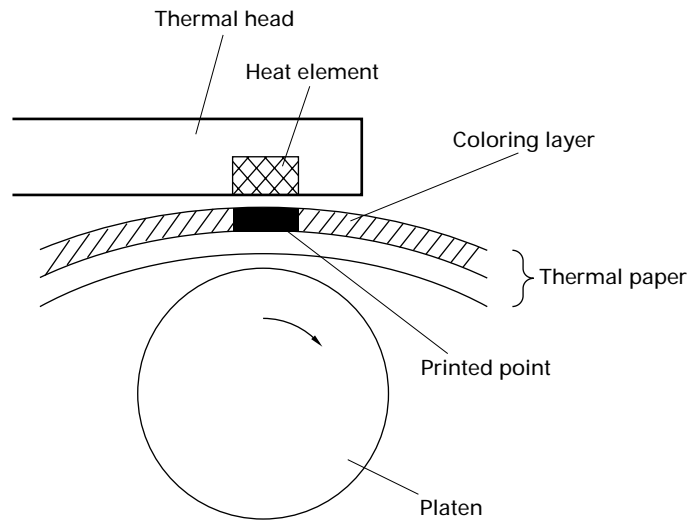


Fig. 2-16 Principle of Thermal Printing

### 3-2. Paper-Feed Mechanism

The paper-feed mechanism is comprised of paper-feed motor, gear train, platen, and thermal printhead. The paper-feed motor drives the gear train, which in turn rotates the platen. The platen carries the thermal paper past the printhead. The paper-feed motor is a PM (permanent magnet) type, 4-phase 48-pole step motor. 3 steps feed the paper approximately 0.125mm.

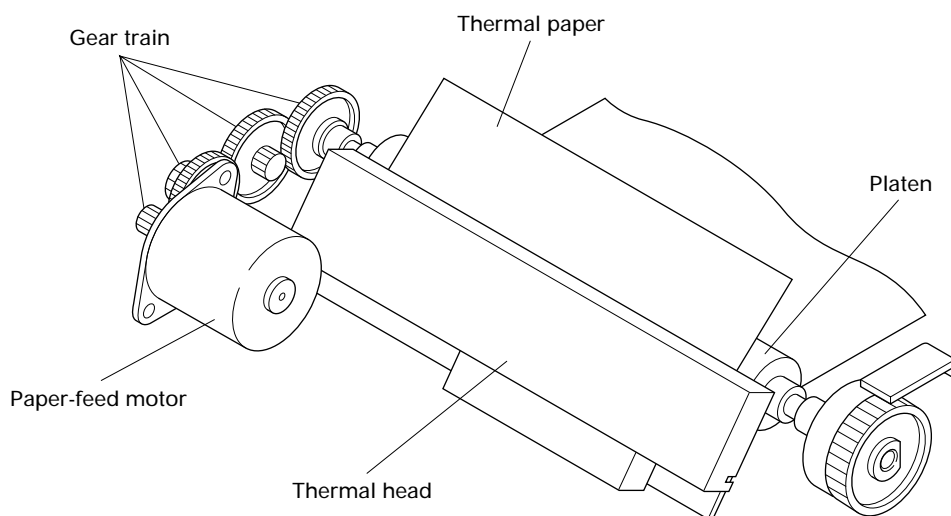


Fig. 2-17 Paper-Feed Mechanism

### 3-3. Detectors

### ① Paper-Out Detector

The paper-out detector (reflective photosensor) is located at the paper entry slit. The photosensor's phototransistor remains ON while paper is present. It goes OFF when paper runs out, generating output of a paper-out signal.

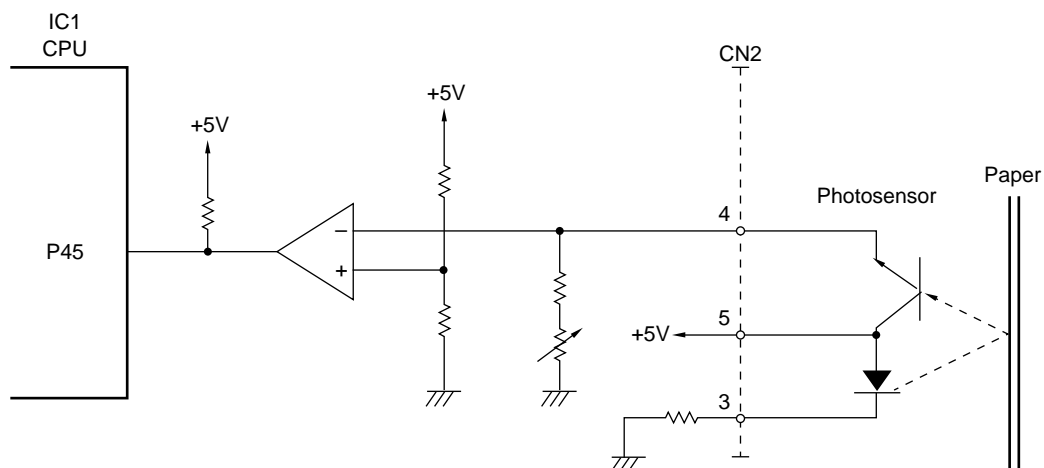


Fig. 2-18 Paper-Out Detector

### ② Paper-Near-End Detector

The near-end detector is mounted in the paper-roll holder.

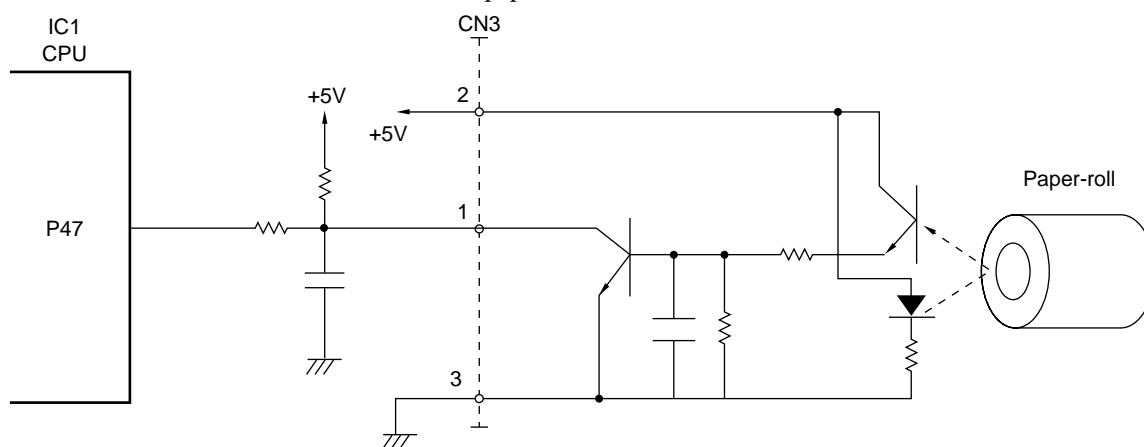


Fig. 2-19 Paper-Near-End Detector

## ③ Head-Up Detector

This detector senses the position of the thermal printhead. The leaf switch closes when the printhead is in contact with the platen, and opens when the printhead is separated from the platen.

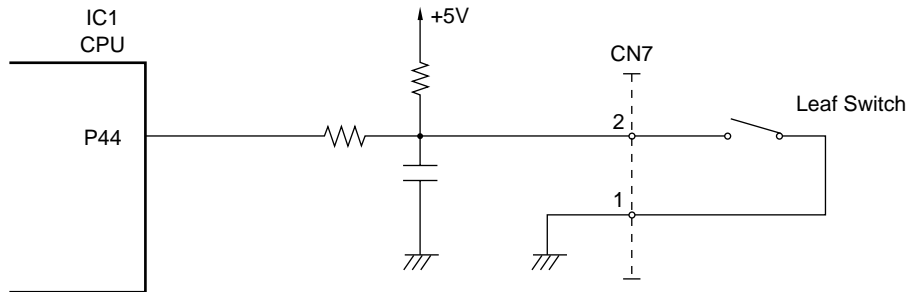


Fig. 2-20 Head-Up Detector

## ④ Cover-Open Detector

This detector senses whether the upper cover is open or closed. The leaf switch closes when the cover closes, and opens when the cover opens.

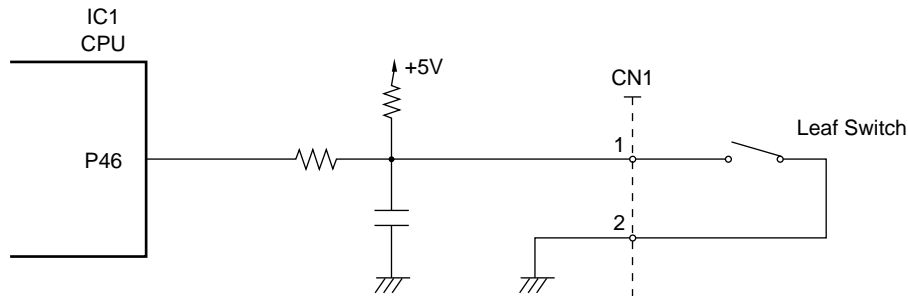


Fig. 2-21 Cover-Open Detector

## 3-4. Auto-Cutter Drive circuit (on TSP242-24/120/230 only)

The TSP242 includes a guillotine-type cutter. The motor rotation direction determines whether the cutter executes a full cut or a partial cut. (The partial cut leaves paper attached at one point.)

Note that Memory Switch 2 Bit 8 must be set ON to enable use of the cutter.

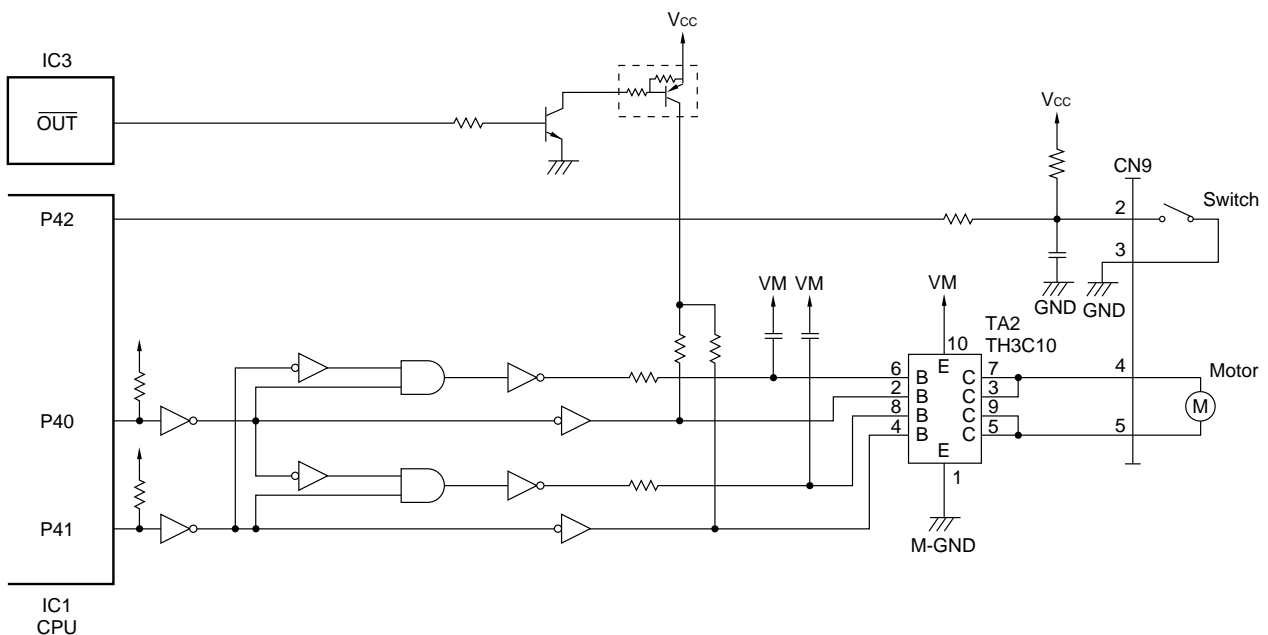
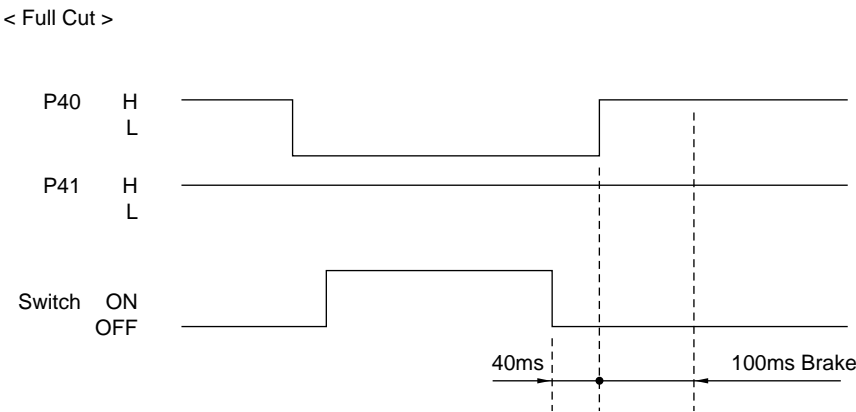


Fig. 2-22 Auto-Cutter Drive Circuit

PRINCIPLES OF OPERATION

<Full Cut>



<Partial Cut>

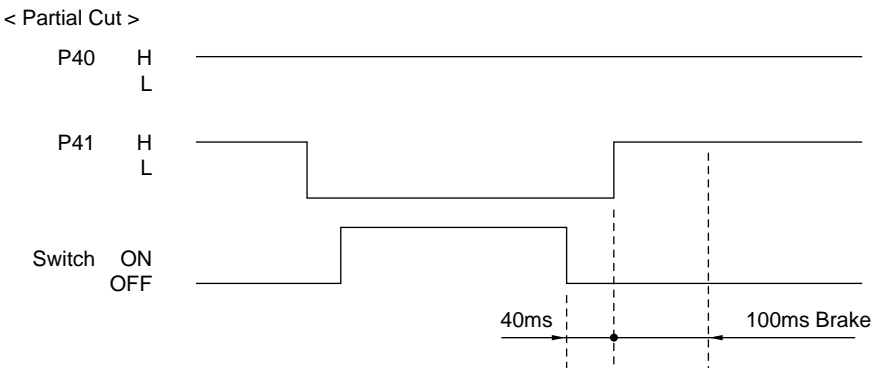


Fig. 2-23 Auto-Cutter Timing Chart

## CHAPTER 3

# PART REPLACEMENT AND RELATED ADJUSTMENT

This chapter presents printer disassembly and reassembly procedures. Please note the following important points.

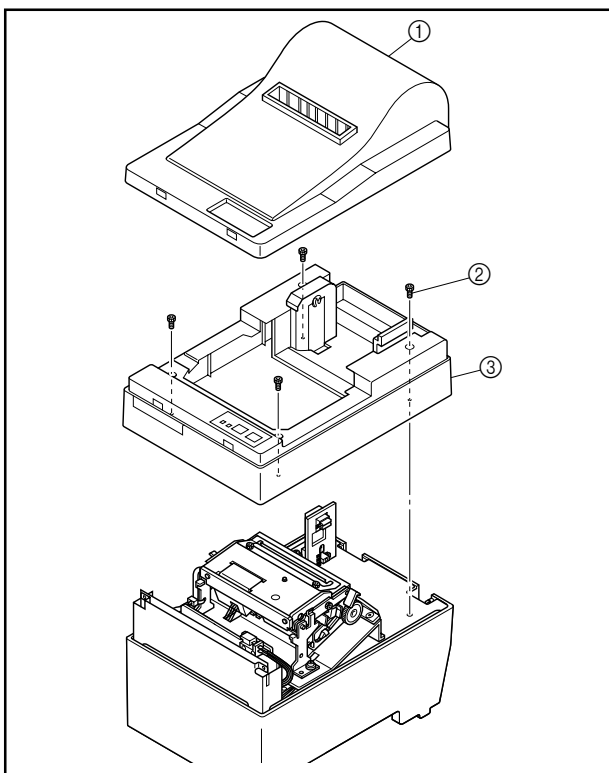
1. Always disconnect the power cord from the AC outlet before beginning work.
2. Except where otherwise indicated, the reassembly procedure is the reverse of the disassembly procedure.
3. Coat screw heads with locking sealant after completing of reassembly.
4. Refer to Chapter 4 Section 2 for information about lubrication. (Chapter 3 does not include any lubrication information.)

Note: This printer has no adjustment sites.

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6. Main Logic Board .....	32
7. Fuses .....	32
8. Thermal-head Unit .....	33

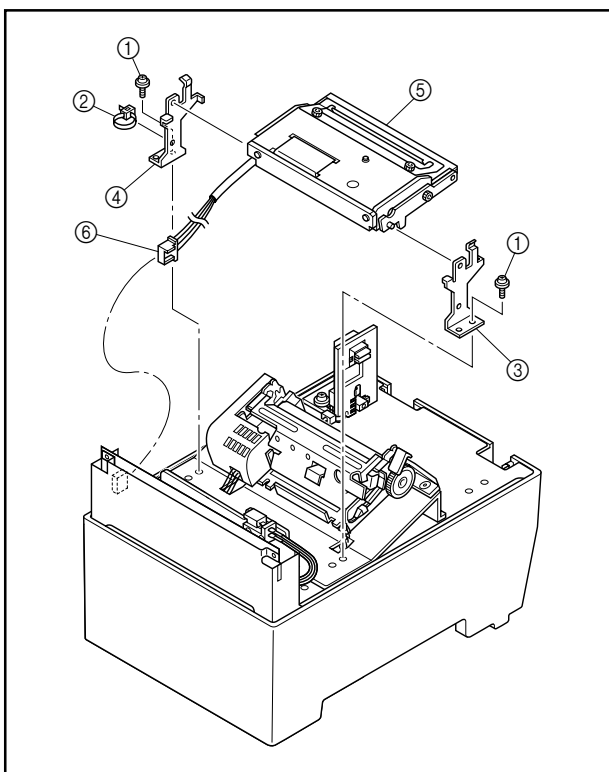






### 1. Upper Case Unit

- (1) Switch off the power, and unplug the power cord from the power outlet.
- (2) Remove:
  - Cover ①
  - Four tapping screws ②
  - Upper case unit ③Remove the upper case unit by lifting it up and off.

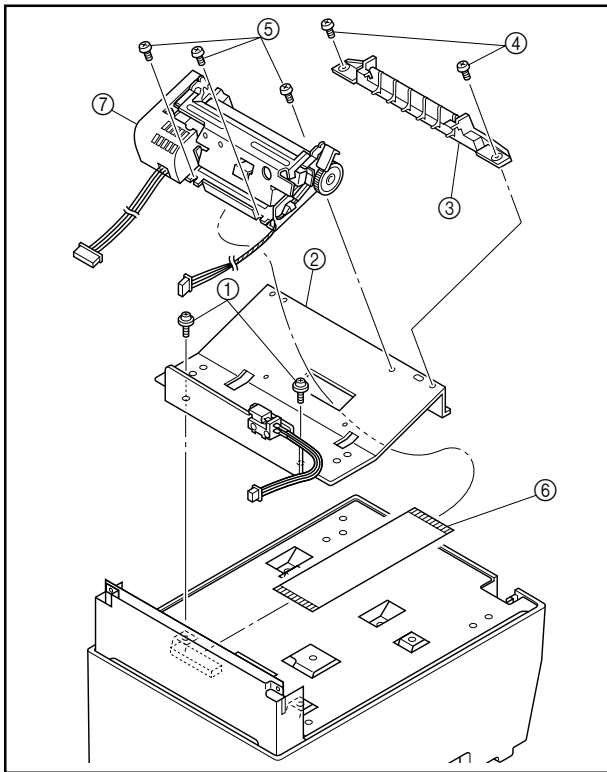


### 2. Auto-Cutter Unit

<Model TSP242-24/120/230 only>

- (1) Remove:
  - Upper case unit (See 1. above.)
  - Two tapping screws ①
  - Wire band ②
  - Cutter Holder Plates R,L ③, ④
  - Cutter Unit ⑤
  - Connector ⑥

## PARTS REPLACEMENT



### 3. Printer Mechanism

<TSP212-24/120/230>

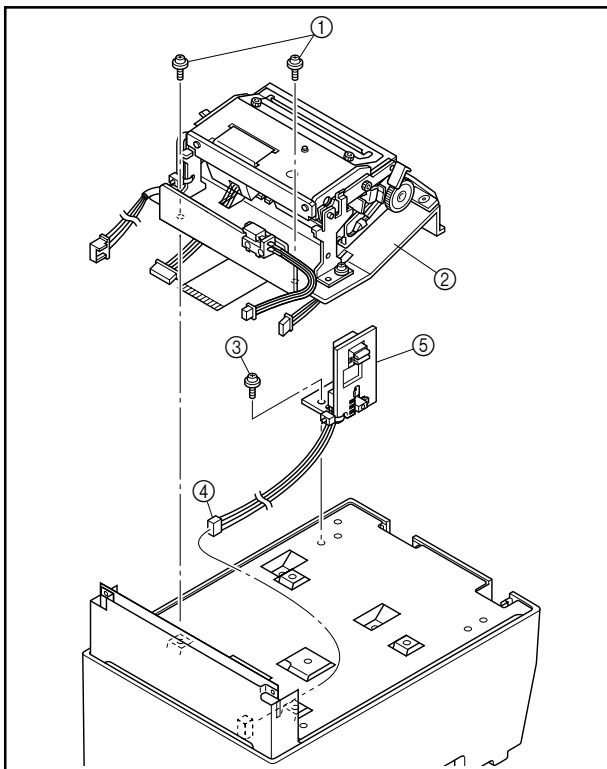
- (1) Remove the upper case unit (see 1. above), then proceed to (2) below.

<TSP242-24/120/230>

- (1) Remove the auto-cutter unit. (See 2. above.)

- (2) Remove:

- Two screws ①
- Sub-chassis ②
- Guide ③
- Two tapping screws ④
- Three tapping screws ④
- Flat cable ⑥
- Connector
- Printer mechanism ⑦

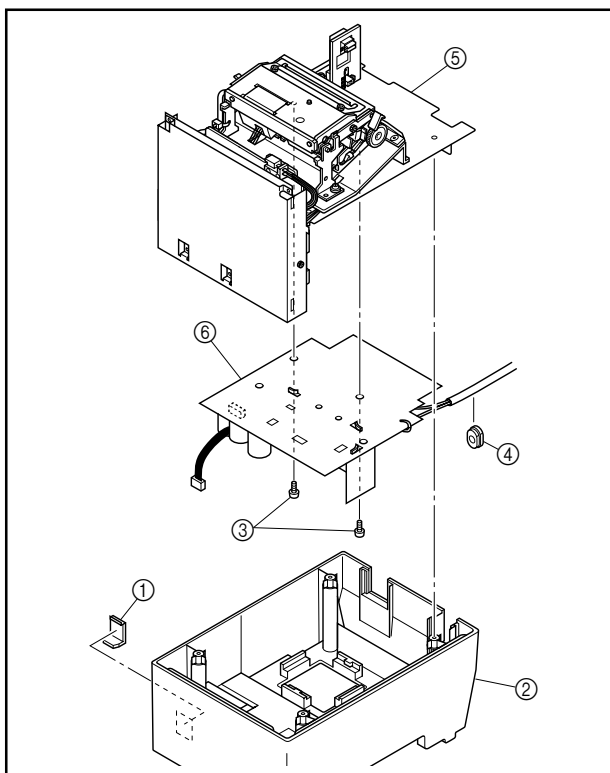


### 4. Near-End-Sensor Unit

- (1) Remove the upper case unit. (See 1. above.)

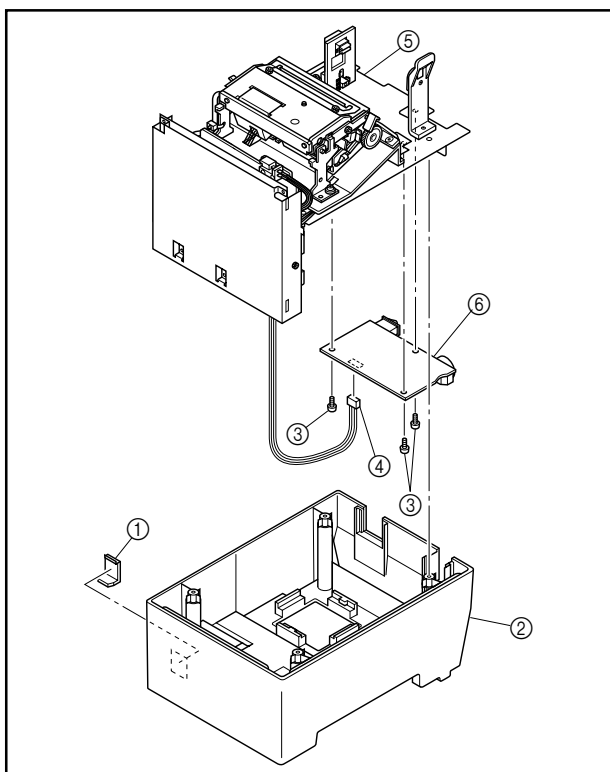
- (2) Remove:

- Two screws ①
- Mechanism sub-chassis ②
- One tapping screw ③
- Connectors ④
- Near-end-sensor unit ⑤



### 5. Power Unit (TSP200-120/230)

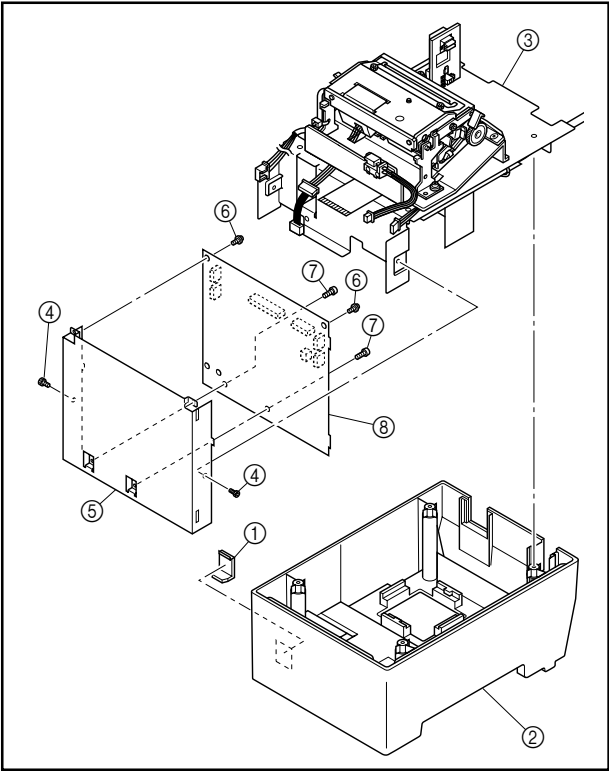
- (1) Remove the upper case unit. (See 1. above.)
- (2) Remove the connector cover ①.
- (3) Remove the main chassis unit ⑤ from the lower casing unit ②.
- (4) Remove:
  - Two screws ③
  - Cord bushing ④
  - Connector
  - Power unit ⑥ from main chassis ⑤



### Power Unit (TSP200-24)

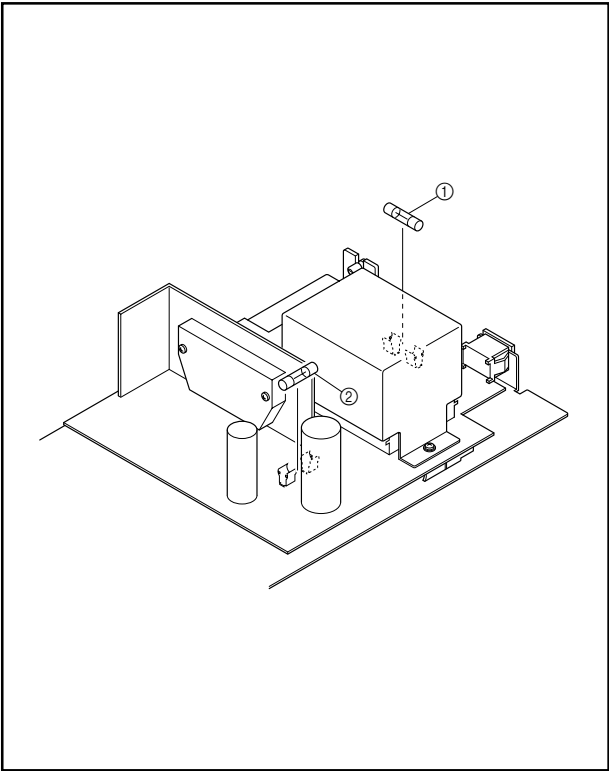
- (1) Remove the upper case unit. (See 1. above.)
- (2) Remove the connector cover ①.
- (3) Remove the main chassis unit ⑤ from the lower casing unit ②.
- (4) Remove:
  - Three screws ③
  - Connector ④
  - Power unit ⑥ from main chassis ⑤

**PARTS REPLACEMENT**



**6. Main Logic Board**

- (1) Remove the upper case unit. (See 1. above.)
- (2) Remove the connector cover ①.
- (3) Remove the main chassis unit ③ from the lower casing unit ②.
- (4) Remove:
  - Two tapping screws ④
  - Board chassis unit ⑤
  - Two tapping screws ⑥
  - Two screws ⑦
  - Connector
  - Main logic board ⑧

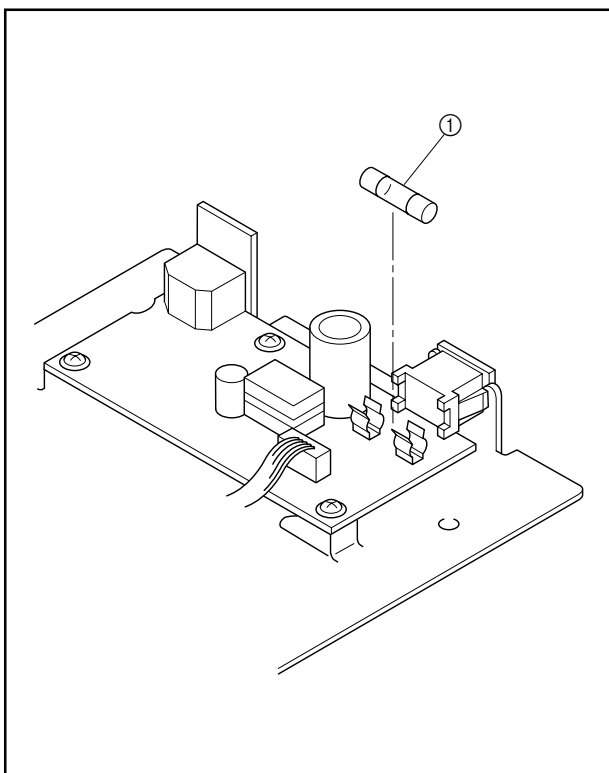


**7. Fuses (TSP200-120/230)**

- (1) Remove the main chassis unit from the lower casing unit. (See 5. above.)
- (2) Check the fuses in the power unit.
  - Fuse F1 ①
  - Fuse F2 ②If fuse is blown, replace it with the fuse type indicated below.

Destination	F1	F2
U.S.A.	5TT1A	5TT3A
EC	EAWK630mA	EAK3.15A
United Kingdom	EAWK630mA	5TT3A

If the replacement fuse also blows out, replace the power unit or check the main logic board.

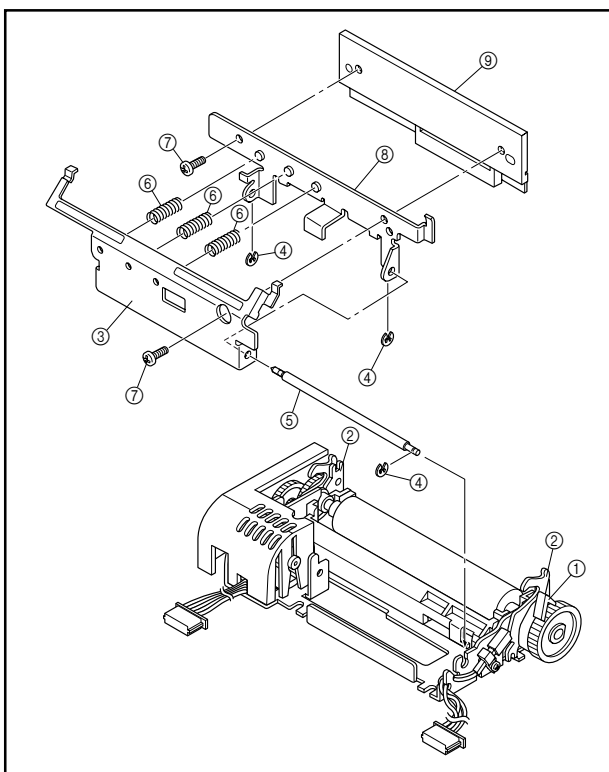


## Fuses (TSP200-24)

- (1) Remove the main chassis unit from the lower casing unit. (See 5. above.)
- (2) Check the fuses in the power unit.
  - Fuse F1 ①  
If fuse is blown, replace it with the fuse type indicated below.

F1
5TT3A

If the replacement fuse also blows out, replace the power unit or check the main logic board.



## 8. Thermal-head Unit

- (1) Remove the printer mechanism. (See 3. above.)
- (2) Be sure that the unit is in head-down state (that the head-lift lever ① is back).
- (3) Press the two head-opening levers ② and remove the set cover ③ from the printer mechanism.
- (4) Remove:
  - Three stop rings ④
  - Stay ⑤
  - Three springs ⑥
  - Two screws ⑦
  - Head plate ⑧
  - Thermal head ⑨
- (5) Attach the replacement thermal head. as follows.
  - (a) Be sure that the unit is in head-open state.
  - (b) Hold the replacement head in position, and screw the right end loosely into place with the one of the screws ⑦.
  - (c) Set the unit into head-closed state.
  - (d) Fit the remaining screw ⑦ into the left side, and tighten both of the screws to a torque of 5g-cm.
- (6) Caution:
 

Keep hands clear of the head's heat elements when making the replacement.



## CHAPTER 4

### MAINTENANCE AND LUBRICATION

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### 1. Maintenance

Proper maintenance is necessary to maintain printer performance and forestall potential problems. Please carry out maintenance as described below.

#### 1-1. Cleaning

(1) Surface dirt

Clear away dirt with a soft cloth. If necessary, apply a small quantity of alcohol to the cloth to improve cleaning power. NEVER use thinner, trichlene, or ketone solvents, as these can cause damage to plastic components.

When cleaning, take care to avoid damaging or moistening of electronic parts, mechanical parts, and wires.

(2) Internal dust

For best results, use an electric vacuum cleaning device to remove dust from the inside of the printer. Note that such cleaning may also remove lubrication; when you have finished cleaning, check lubrication levels and apply lubricant as necessary.

#### 1-2. Checks

There are two types of maintenance checks. Simple “daily checks” can be performed by users during the course of daily operation. “Periodic checks” must be carried out by qualified service personnel.

(1) Daily checks

- Check whether dirt or other foreign matter has worked its way into the printer, and remove as necessary.
- Check the thermal head for excessive dirt. If the head is very dirty, clean it with a cotton stick or a soft cloth soaked in alcohol.

(2) Periodic checks

Periodic checks and lubrication should be carried out once every six months or once every million lines of printing.

- Check the integrity of springs.
- Clear dust from areas around the detectors.



## MAINTENANCE AND LUBRICATION

---

### 2. Lubrication

Proper lubrication is essential for maintaining the printer's performance level and preventing breakdowns or other problems.

#### 2-1. Lubricants

Choice of lubrication can significantly affect the printer's performance, longevity, and low-temperature characteristics. We recommend the following lubricant for this printer.

Type	Name	Manufacturer
Grease	Molykote EM	Dow Corning

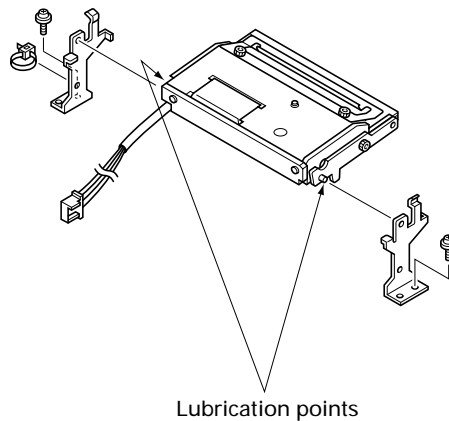
#### 2-2. Application Method

If you are lubricating parts during disassembly or reassembly, be sure to wash or wipe the parts thoroughly to remove all dirt and dust prior to lubricating.

Remember that cleaning can remove necessary lubrication. Always lubricate after cleaning, disassembly, or replacement.

#### 2-3. Lubrication Points

Apply lubricants at the following locations.





# CHAPTER 5

## PARTS LIST

### HOW TO USE PARTS LIST

- (1) **DRWG. NO.**  
This column shows the drawing number of the illustration.
- (2) **REVISED EDITION MARK**  
This column shows a revision number.  
Parts that have been added in the revised edition are indicated with “#”.  
Parts that have been abolished in the revised edition are indicated with “\*”.  
#1:First edition → Second edition      \*1:First edition → Second edition
- (3) **PARTS NO.**  
Parts numbers must be notified when ordering replacement parts. Parts described as “NPN” have no parts number and are not in stock, i.e., unavailable.
- (4) **PARTS NAME**  
Parts names must be notified when ordering replacement parts.
- (5) **Q'TY**  
This column shows the number of the part used as indicated in the figure.
- (6) **REMARKS**  
Where differences in specifications exist depending on location/destination.
- (7) **RANK**  
Parts marked “S” are service parts. Service parts are recommended to be in stock for maintenance.

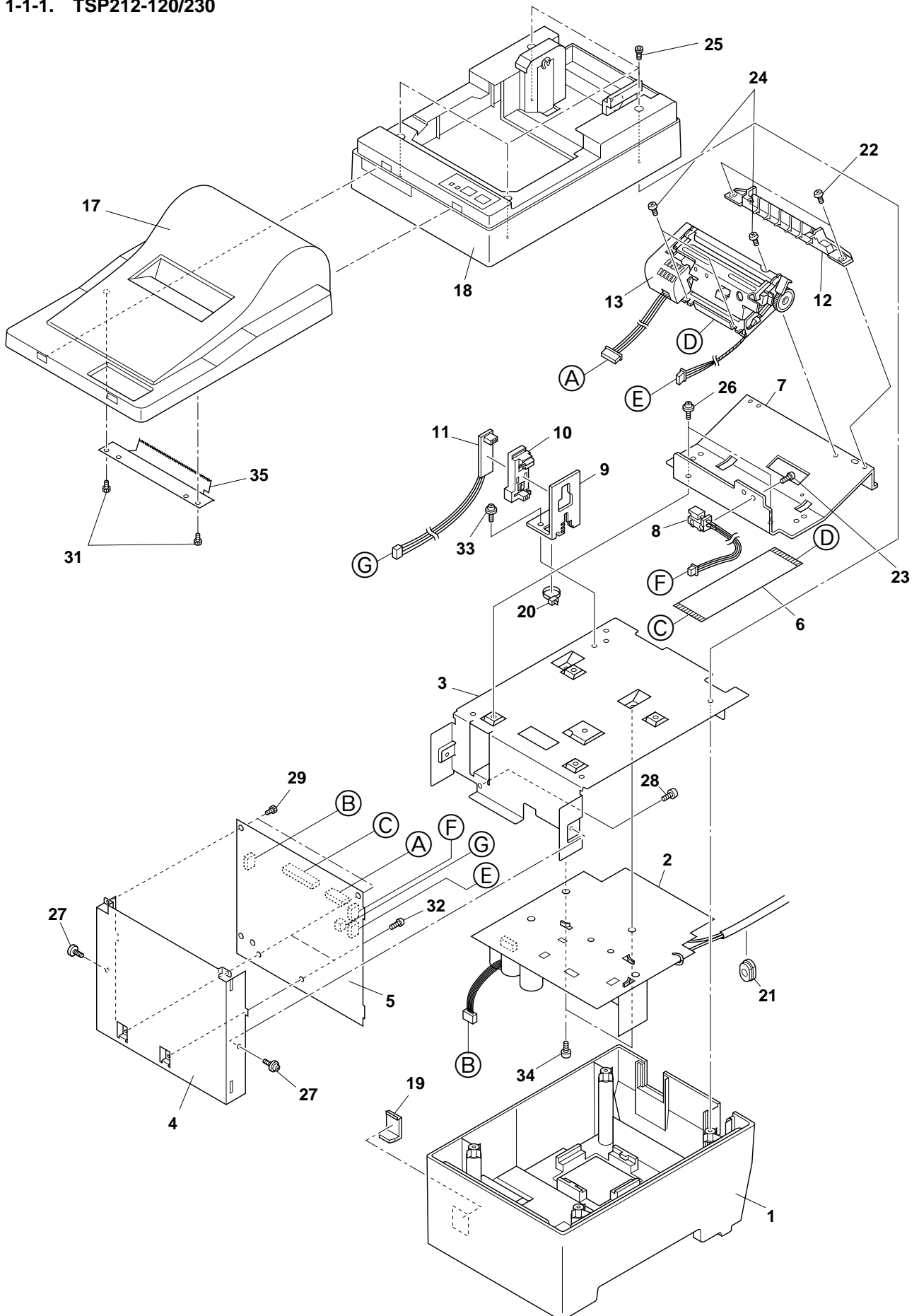
5

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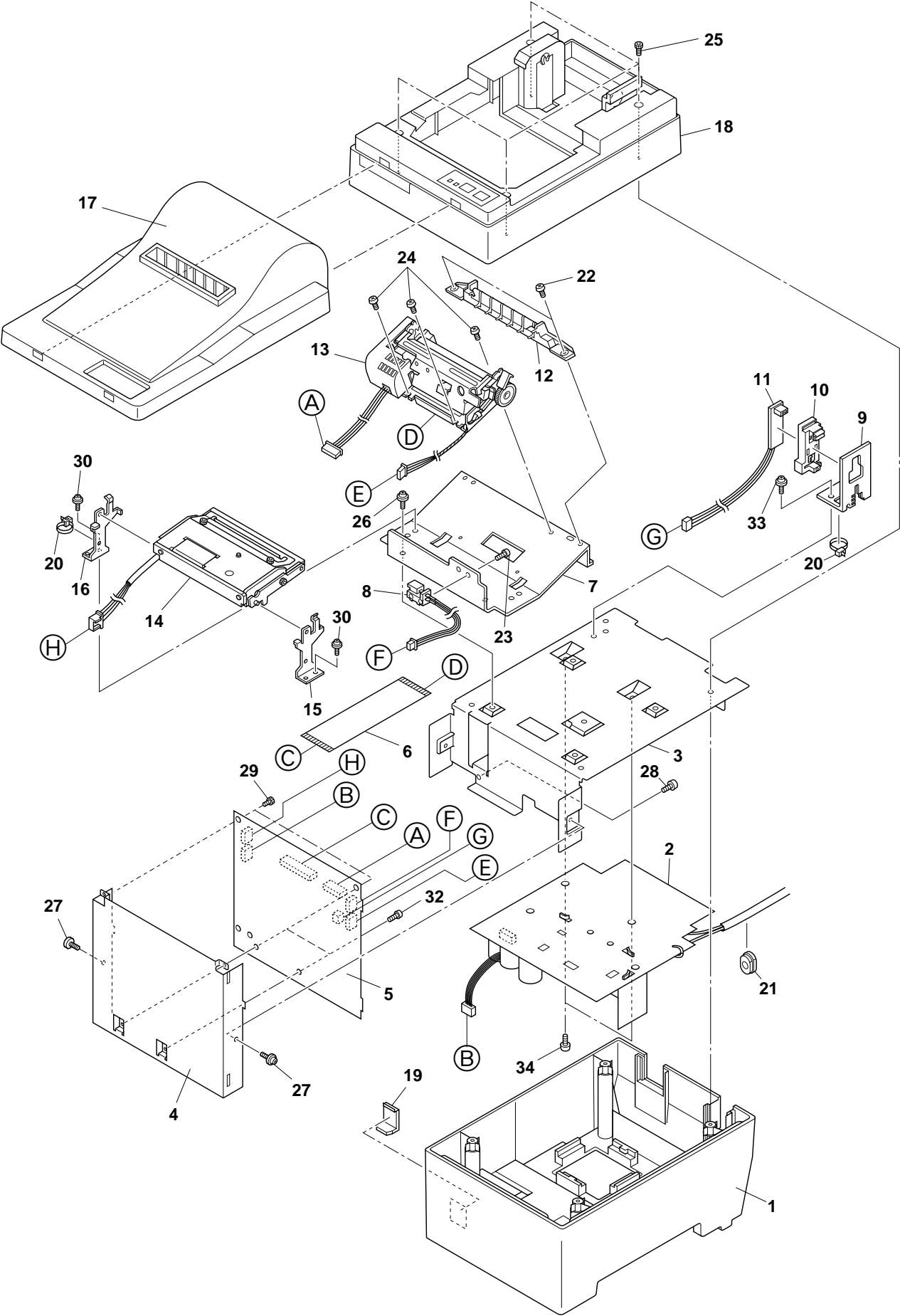
# 1. Printer Assembly

## 1-1. Disassembly Drawing

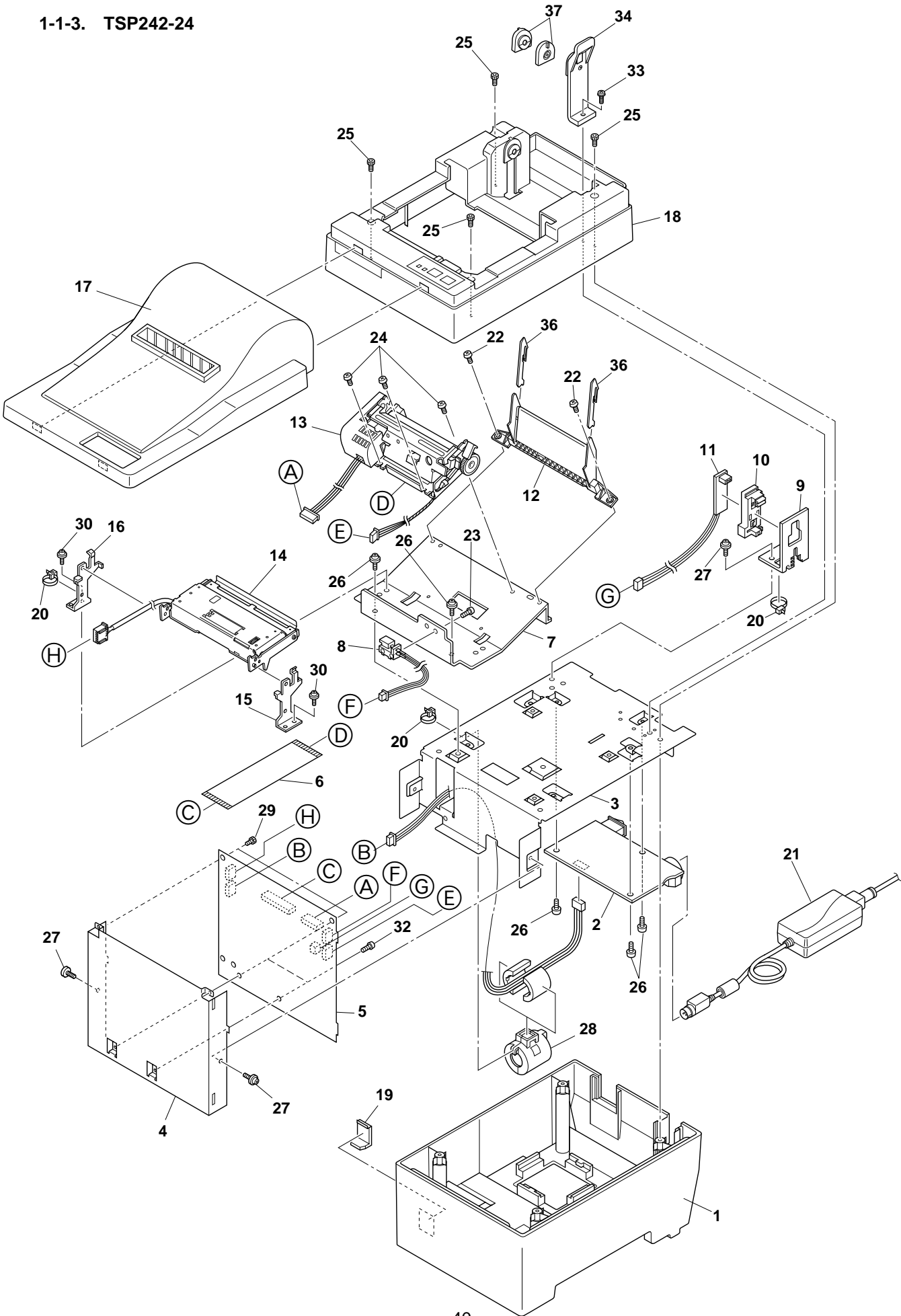
### 1-1-1. TSP212-120/230



1-1-2. TSP242-120/230



1-1-3. TSP242-24



## 1-2. Parts List

### 1-2-1. TSP200-120/230

#### Printer Assembly(TSP200-120/230)

DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
1		37300011	LOWER CASE UNIT SP2	1		S
2		37309010	POWER SUPPLY UNIT SP2-120 US	1	FOR US	S
		37309030	POWER SUPPLY UNIT SP2-230 EC	1	FOR EC	S
		37309040	POWER SUPPLY UNIT SP2-240 UK	1	FOR UK	S
3	*1	32010011	MAIN CHASSIS SP2	1		
	#1	32010012	MAIN CHASSIS SP2	1		
4		32010030	BOARD CHASSIS P SP2	1		
5		37437010	TBD212-24 UNIT TSP2	1	TSP212	S
		37437110	TBD242-24 UNIT TSP2	1	TSP242	S
6		30722000	FLAT CABLE 24X105 TSP2	1		S
7		32010050	SUB-CHASSIS TSP2	1		
8		37432200	COVER OPEN SWITCH UNIT TSP2	1		S
9		32043500	DETECTOR HOLDER PLATE TSP2	1		
10		33020500	NEAR-END DETECTOR COVER TSP2	1		
11		37437400	DETECTOR BOARD ASSY TSP2	1		S
12		33900060	ASSIST GUIDE TSP2	1		
13		38420000	TMP212A-24	1	TSP212	S
		38420100	TMP212B-24	1	TSP242	S
14		37432000	CUTTER 4022-24V UNIT TSP2	1	TSP242	S
15		32043210	CUTTER HOLDER PLATE R TSP2	1	TSP242	
16		32043220	CUTTER HOLDER PLATE L TSP2	1	TSP242	
17		33020022	COVER SP2	1	TSP212	S
		33020060	COVER TSP2	1	TSP242	S
18		37431000	UPPER CASE UNIT TSP2	1		S
19		83911720	CONNECTOR COVER SP312	1		
20		04991204	FASTENER T18S	1	TSP212	S
		04991204	FASTENER T18S	2	TSP242	S
21		04991220	CORD BUSHING SR-5N-4	1		S
22		00926603	SCREW TAT 2.6-6 CT	2		S
23		00926803	SCREW TAT 2.6-8 PT	1		S
24		01902618	SCREW TAT 2.6-4	3		S
25		01903058	SCREW TAT 3-10 PT	4		S
26		01903059	SCREW TR 3-5 FL	2		S
27	*1	01903064	SCREW TAT 3-5 CT	2		S
	#1	01903101	SCREW TAT 3-6 CT-FL	2		S
28		01903026	SCREW TR 3-5 WB	1		S
29		01903069	SCREW TAT 3-5 ST-FL	2		S
30		01903077	SCREW TAT 3-5 CT-FL	2	TSP242	S
31		00930603	SCREW TAT 3-6 PT	2	TSP212	S
32		01903033	SCREW TR 3-12	2		S
33	*1	01903077	SCREW TAT 3-5 CT-FL	1		S
	#1	01903101	SCREW TAT 3-6 CT-FL	1		S
34		01914003	SCREW TR 4-10 WS/WF	2		S
35		32970010	TEAR BAR SP2	1	TSP212	
-		04991204	FASTENER T18S	1	FOR EC,UK :ACCESSARY	
		09990723	FERRITE CORE TFC-23-11-14	1	FOR EC,UK :ACCESSARY	
		30970030	THERMAL ROLL PAPER 76X35D	1	:ACCESSARY	

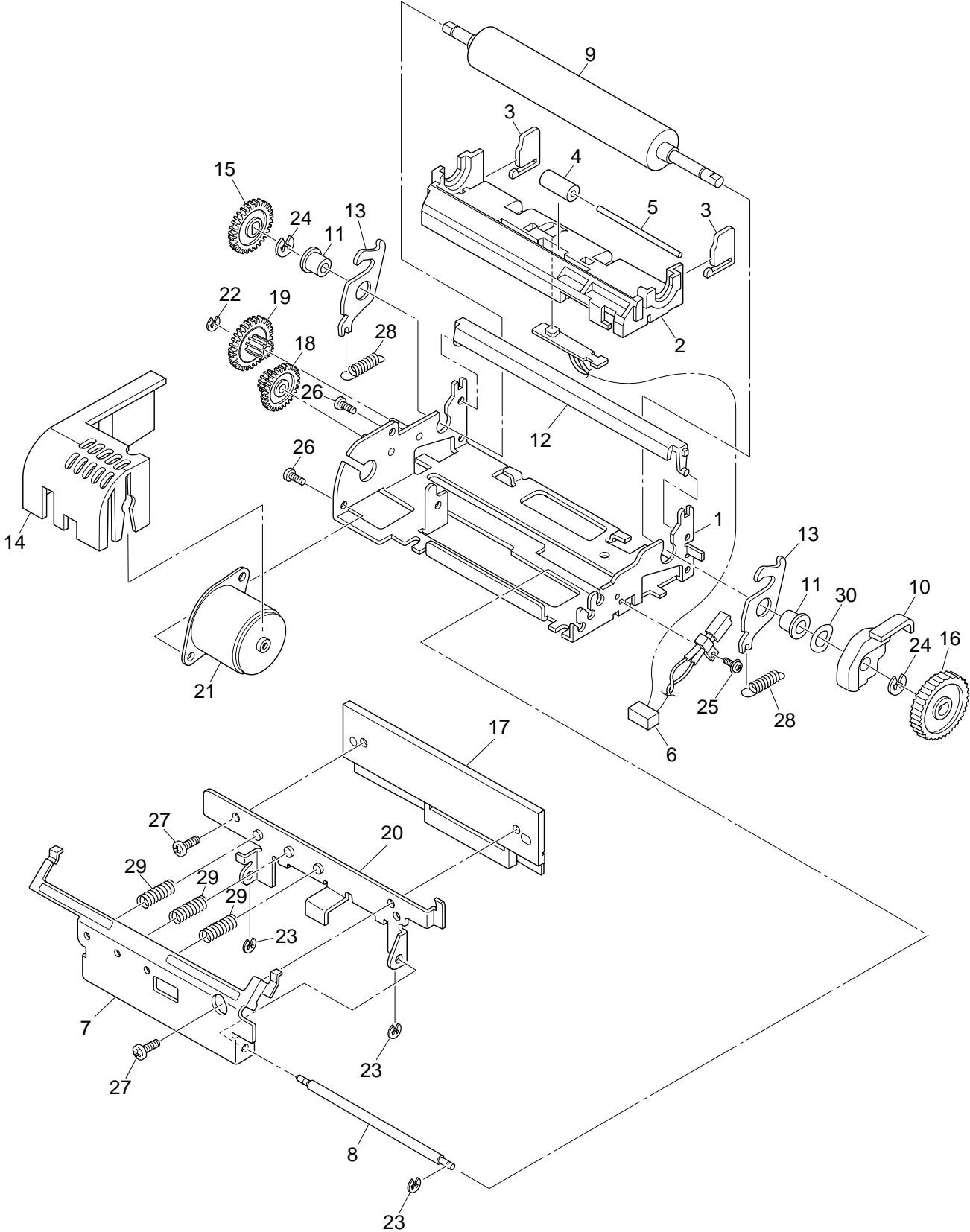
## 1-2-2. TSP200-24

### Printer Assembly(TSP200-24)

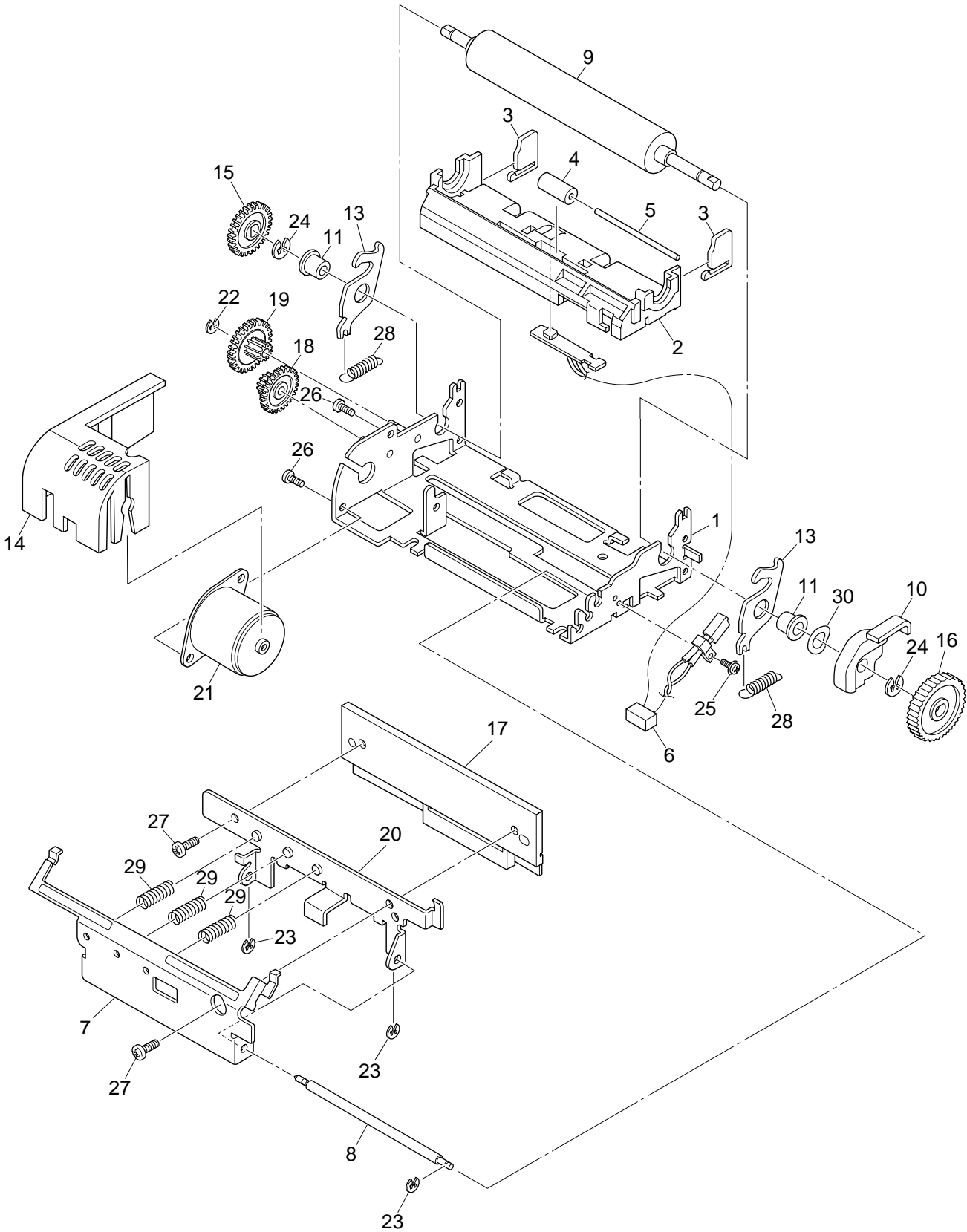
DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
1		37300011	LOWER CASE UNIT SP2	1		S
2		37439000	POWER SUPPLY UNIT TSP2-24	1		S
3		32010130	MAIN CHASSIS TSP2-24	1		
4		32010030	BOARD CHASSIS P SP2	1		
5		37437010	TBD212-24 UNIT TSP2	1	TSP212-24	S
		37437110	TBD242-24 UNIT TSP2	1	TSP242-24	S
6		30722000	FLAT CABLE 24X105 TSP2	1		S
7		32010050	SUB-CHASSIS TSP2	1		
8		37432200	COVER OPEN SWITCH UNIT TSP2	1		S
9		32043500	DETECTOR HOLDER PLATE TSP2	1		
10		33020500	NEAR-END DETECTOR COVER TSP2	1		
11		37437400	DETECTOR BOARD ASSY TSP2	1		S
12		33900070	ASSIST GUIDE A TSP2	1		
13		38420400	TMP212E-24	1	TSP212-24	S
		38420300	TMP212D-24	1	TSP242-24	S
14		37432010	CUTTER ACS230 UNIT TSP2	1	TSP242-24	S
15		32043210	CUTTER HOLDER PLATE R TSP2	1	TSP242-24	
16		32043220	CUTTER HOLDER PLATE L TSP2	1	TSP242-24	
17		33020170	COVER B TSP2	1	TSP212-24	S
		33020091	COVER A TSP2	1	TSP242-24	S
18		37431050	UPPER CASE UNIT TSP2-24	1		S
19		83911720	CONNECTOR COVER SP312	1		
20		04991204	FASTENER T18S	3		S
21		30781130	ADAPTER SET PS48 US	1	FOR US	S
		30781140	ADAPTER SET PS48 EC	1	FOR EC	S
		30781150	ADAPTER SET PS48 UK	1	FOR UK	S
		30781160	ADAPTER SET PS48 AS	1	FOR AS	S
22		00926603	SCREW TAT 2.6-6 CT	2		S
23		00926803	SCREW TAT 2.6-8 PT	1		S
24		01902618	SCREW TAT 2.6-4	3		S
25		01903058	SCREW TAT 3-10 PT	4		S
26		01903059	SCREW TR 3-5 FL	5		S
27		01903101	SCREW TAT 3-6 CT-FL	3		S
28		09990713	FERRITE CORE TFC-16-8-16	1		S
29		01903069	SCREW TAT 3-5 ST-FL	2		S
30		01903077	SCREW TAT 3-5 CT-FL	2	TSP242-24	S
31		00930603	SCREW TAT 3-6 PT	2	TSP212-24	S
32		01903033	SCREW TR 3-12	2		S
33		01903055	SCREW TR 3-8 WS/WF	1		S
34		37430300	HOLDER LEVER UNIT TSP2	1		
35		32970010	TEAR BAR SP2	1	TSP212-24	
36		33900080	ASSIST SPACER TSP2	2		
37		33910150	HOLDER SP24	2		
-		30970040	THERMAL ROLL PAPER 80X35D	1	ACCESSARY	
		09990723	FERRITE CORE TFC-23-11-14	1	ACCESSARY	



**2. Printer Mechanism**  
**2-1. Disassembly Drawing**  
**2-1-1. TSP212**



2-1-2. TSP242



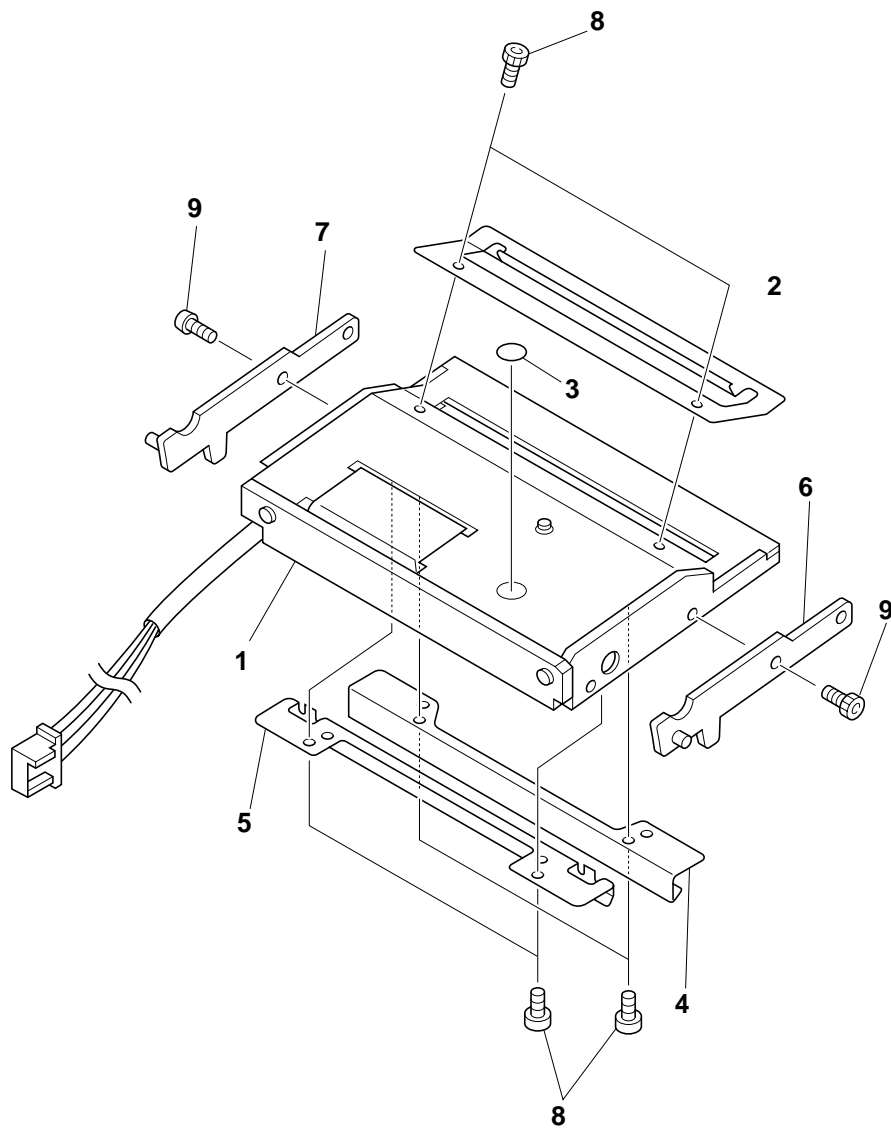
## 2-2. Parts List

### Printer Mechanism

DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
1		37440400	FRAME ASSY TMP2	1		
2		33910070	PAPER GUIDE A TMP2	1		
3		33900050	SUB-GUIDE TMP2	2	TSP212/242	
4		33210020	HOLDER ROLLER TMP2	1		
5		30365020	HOLDER ROLLER SHAFT TMP2	1		
6		37447000	DETECTOR UNIT TMP2	1		S
7		32025030	SET COVER TMP2	1		
8		31360000	STAY TMP2	1		
9		30375010	PLATEN TMP2	1		S
10		33490020	HEAD-UP LEVER TMP2	1		
11		04310403	OILESS BUSHING F4X6X5	2		S
12		33910080	PAPER GUIDE B TMP2	1	TSP212/212-24	
13		32490020	HEAD OPEN LEVER TMP2	2		S
14		33020300	MOTOR COVER TMP2	1		
15		33101510	PLATEN GEAR TMP2	1		S
16		33990000	PLATEN KNOB TMP2	1		S
17		30905021	THERMAL HEAD M22E	1	TSP212-24/242-24	S
		30905030	THERMAL HEAD RJ072-8S63	1	TSP212/242	S
18		33102230	GEAR 20X43X0.35 TMP2	1		S
19		33102220	GEAR 13X44X0.35 TMP2	1		S
20		32042030	HEAD PLATE TMP2	1		
21		37442400	MOTOR ASSY TMP2	1		S
22		04020002	STOP RING SE1.5	1		S
23		04020010	STOP RING SE2.0	3		S
24		04020004	STOP RING SE2.5	2		S
25		01901709	SCREW TAT 1.7-5 CT FL	1		S
26		00820304	SCREW TR 2-3	2		S
27		00626404	SCREW TR 2.6-4	2		S
28		30510300	SPRING E032-035-0109	2		S
29		30520040	SPRING C048-054-0110	3		S
30		82500860	WAVE WASHER 834G	1		

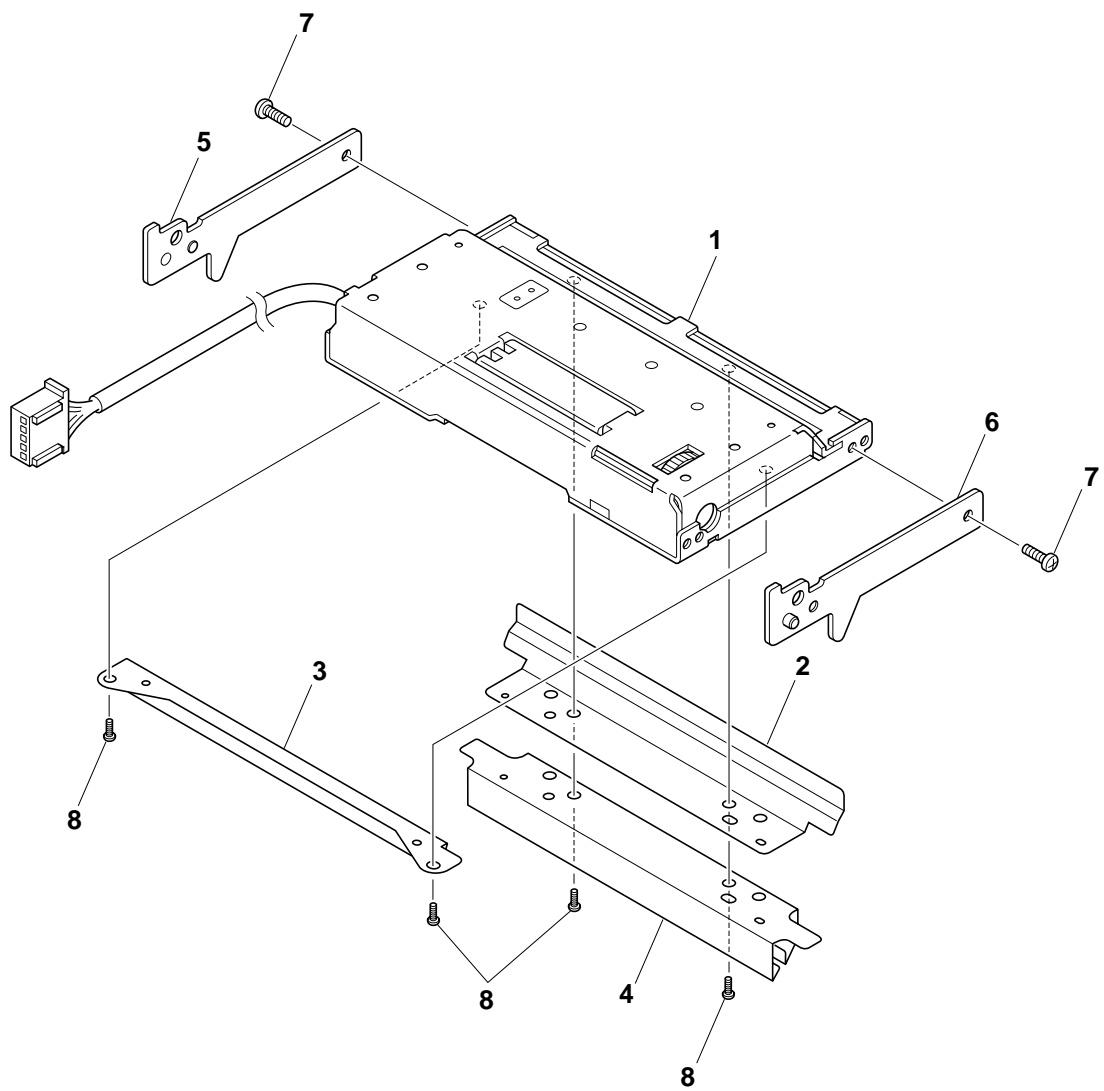
### 3. Cutter Unit

#### 3-1. TSP200-120/230



DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
1		04991512	CUTTER 4022-24V	1		S
2		32025040	CUTTER EJECT COVER TSP2	1		
3		45049930	POLARITY LABEL QMB-06S	1		
4		32045430	CUTTER GUIDE A TSP2	1		
5		32045440	CUTTER GUIDE B TSP2	1		
6		37433500	CUTTER SUPPORT R ASSY TSP2	1		
7		37433510	CUTTER SUPPORT L ASSY TSP2	1		
8		00820304	SCREW TR 2-3	6		S
9		00626404	SCREW TR 2.6-4	2		S

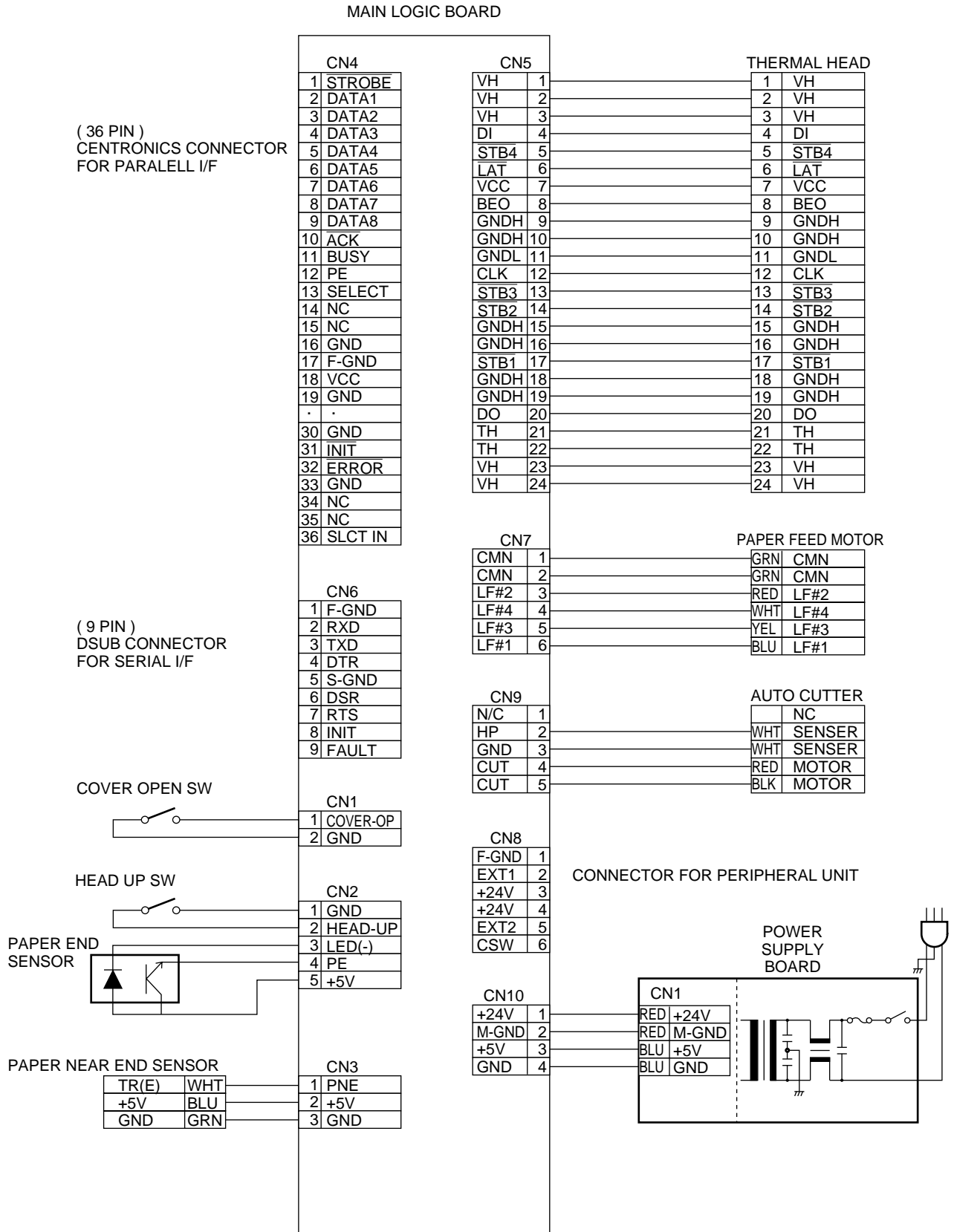
3-2. TSP200-24



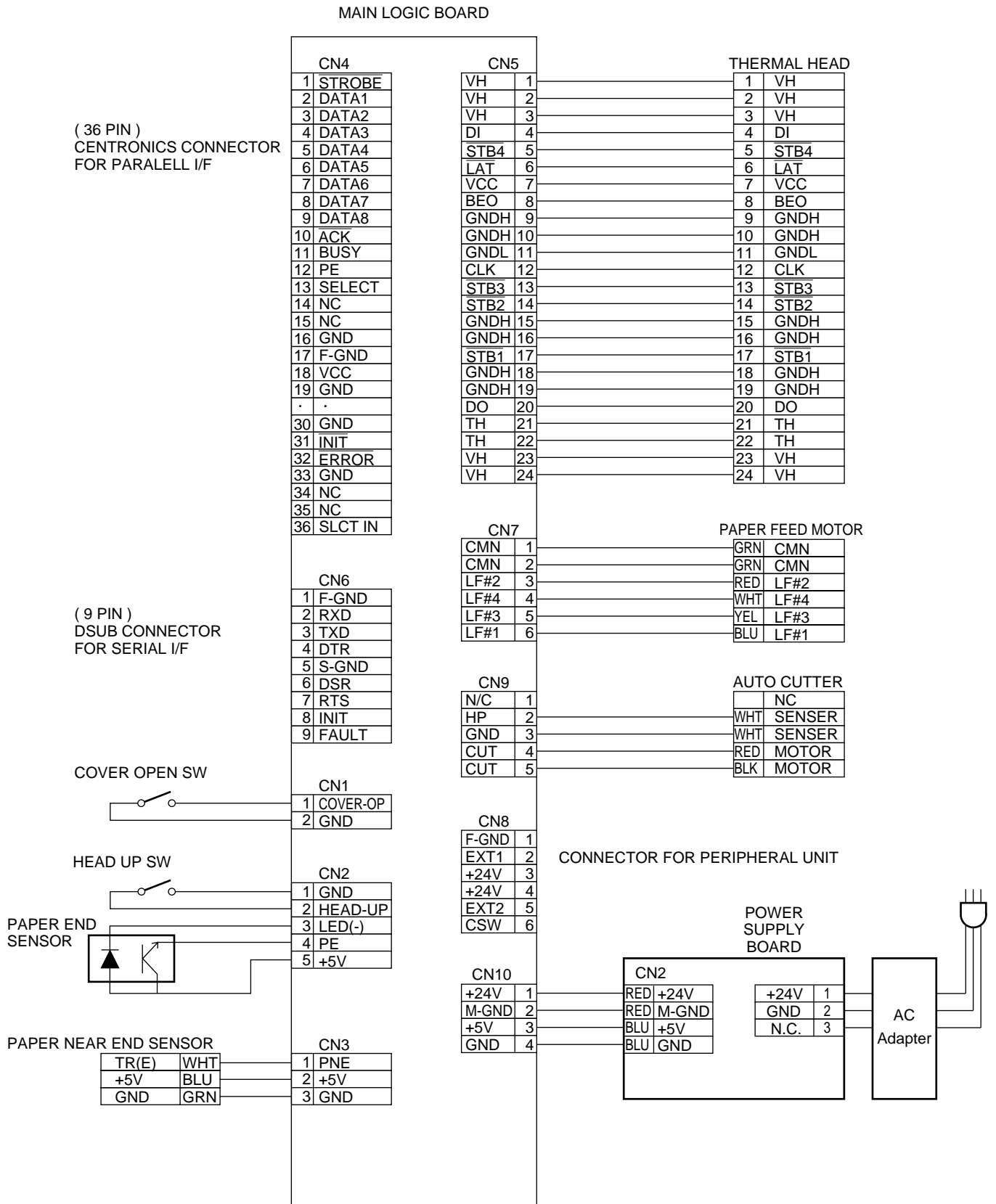
DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
1		04991516	CUTTER ACS-230STR	1		S
2		30990240	PAPER GUIDE TSP2	1		
3		30040020	MOUSE PLATE F2 TSP2	1		
4		32045470	CUTTER GUIDE C TSP2	1		
5		37433530	CUTTER SUPPORT L ASSY TSP2A	1		
6		37433520	CUTTER SUPPORT R ASSY TSP2A	1		
7		00926503	SCREW TAT 2.6-5 CT	2		S
8		01902018	SCREW TAT 2-4	4		S

## 4. Wiring Scheme of Printer

### 4-1. TSP200-120/230

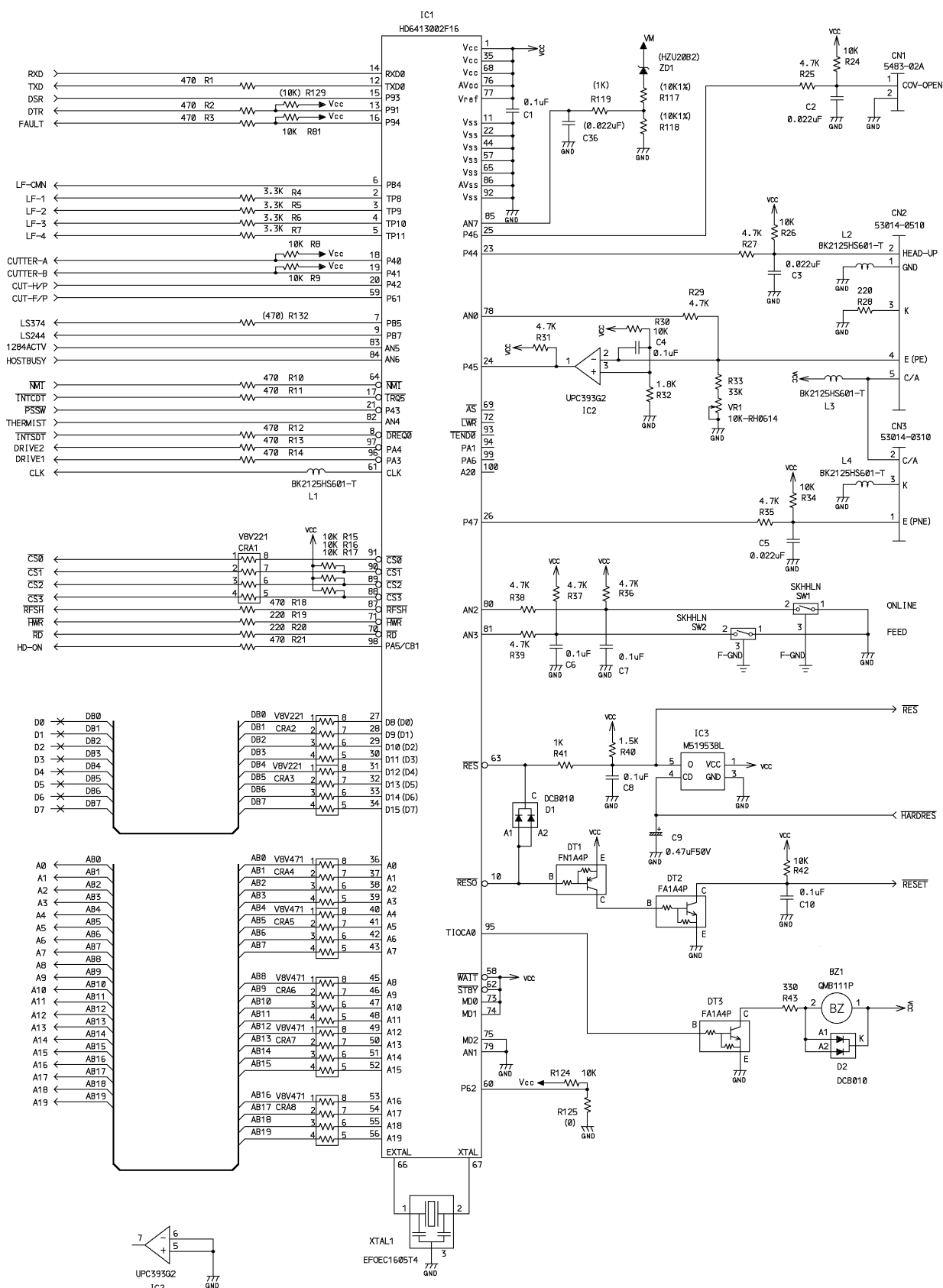


## 4-2. TSP200-24



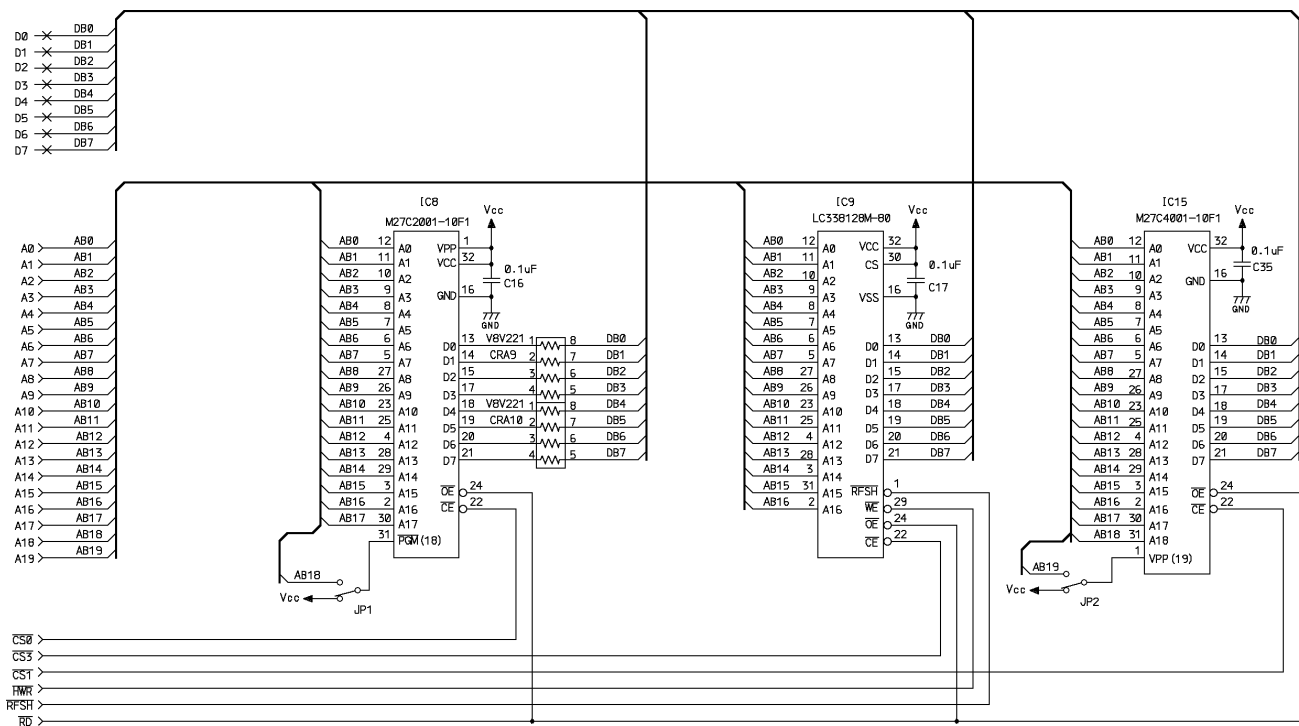
## 5. Main Logic Board

### 5-1. Circuit Diagram



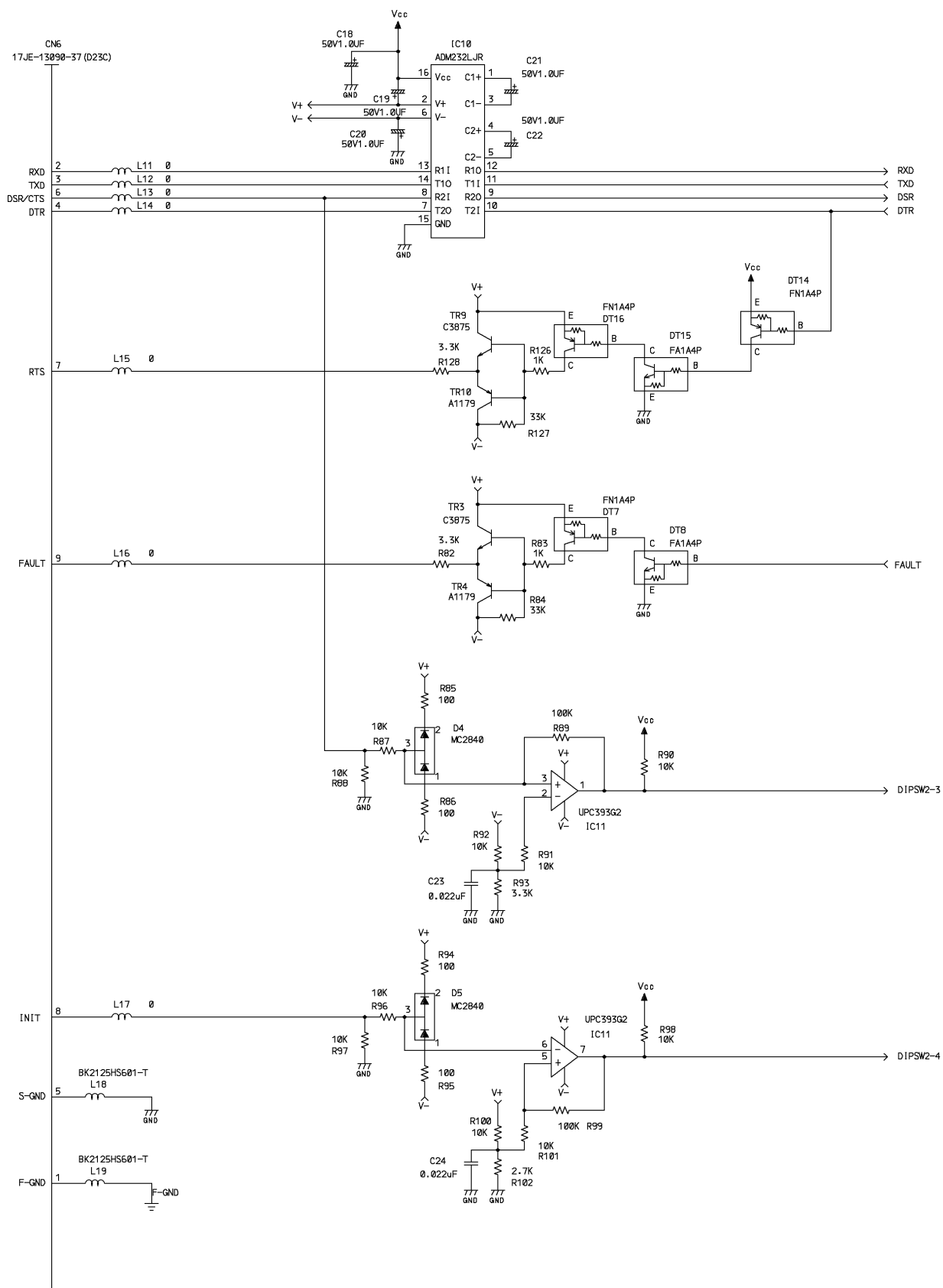




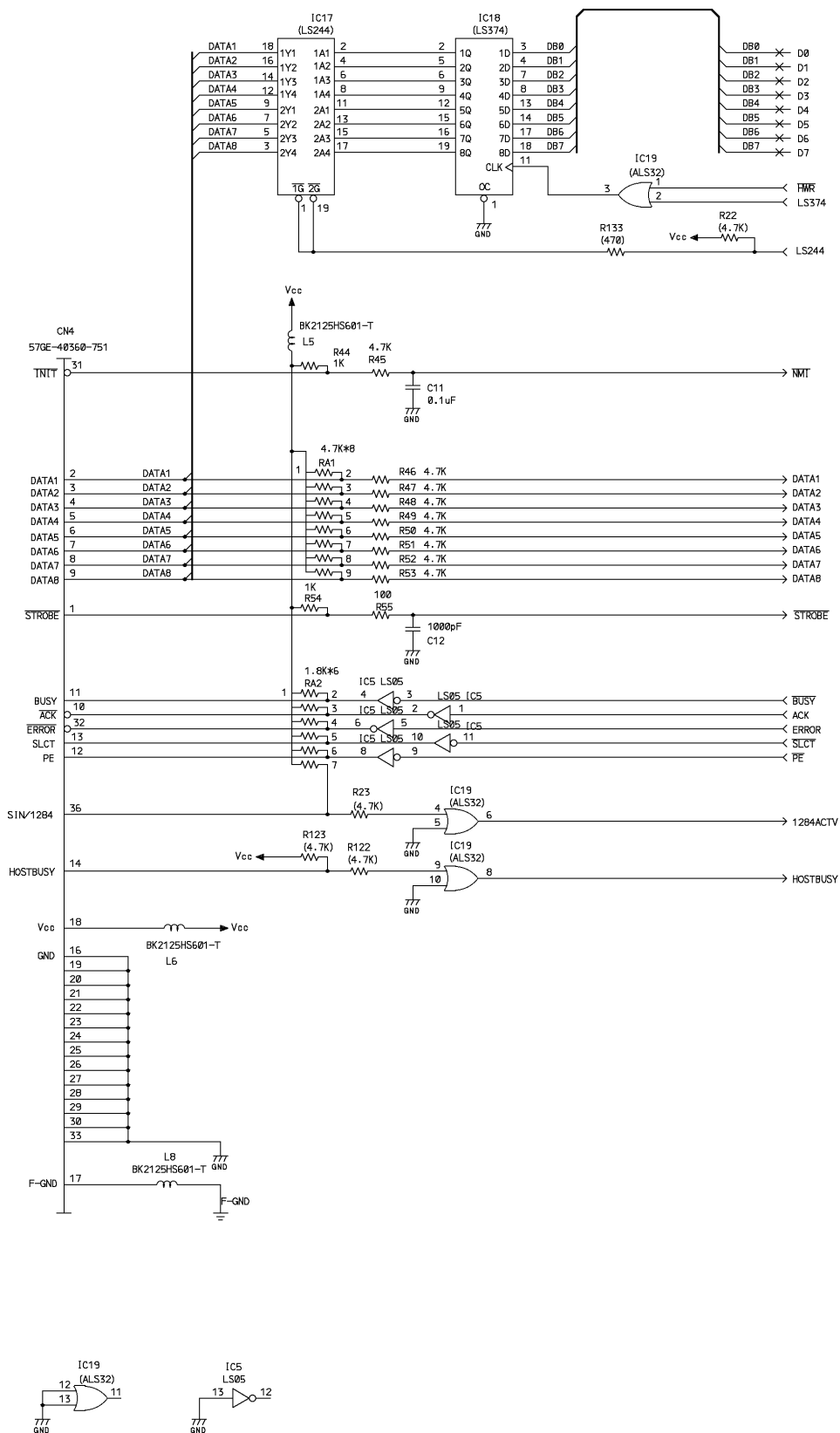


Main Logic Board (3/6)



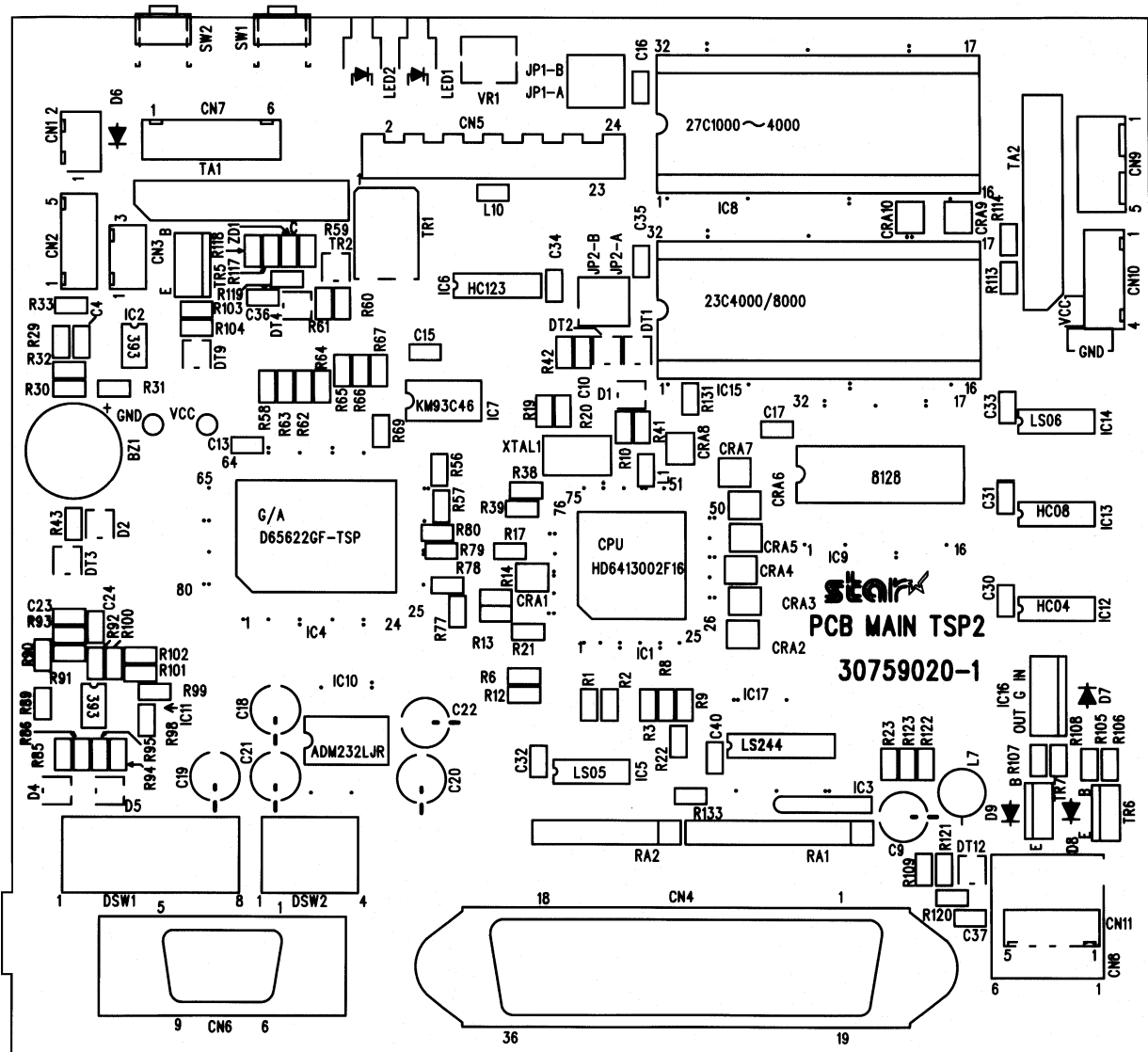


Main Logic Board (5/6)



Main Logic Board (6/6)

## 5-2. Component Layout



### 5-3. Parts List

#### Main Logic Board

DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
IC1		08251008	CPU HD6413002F-16MHZ	1		S
IC2		08201013	IC-LIN UPC393G2*T1	1		S
IC3		08200109	IC-RESET M51953BL	1		
IC4		08240076	GATE ARRAY D65622GF-TSP	1		S
IC5		08210126	TTL IC 74LS05FP*EL	1		S
IC6		08231054	CMOS 74HC123AFP*EL	1		
IC7		08222047	EEPROM KM93C46	1		
IC8		08222095	EPROM M27C2001-10F1	1	TS2.**	S
		09110121	IC SOCKET DILB-32P-8J	1		
IC9	*1	08221049	PSRAM LC338128M-80	1		S
	#1	08221062	PSRAM LC338128M80*ER	1		S
IC10		08200157	IC-I/F ADM232LJR*SOL16	1		S
IC11		08201013	IC-LIN UPC393G2*T1	1		S
IC12		08231042	CMOS 74HC04FP*EL	1	TSP242/242-24	
IC13		08231053	CMOS 74HC08AP*EL	1	TSP242/242-24	
IC14		08210127	TTL IC 74LS06FP*EL	1	TSP242/242-24	
IC15					NOT MOUNTED	
IC16		08202011	IC-REG UPC7824	1		
IC17-19					NOT MOUNTED	
TA1		07650054	TRANSISTOR ARRAY MP4020	1		S
TA2		07650037	TRANSISTOR ARRAY TH3C10	1	TSP242/242-24	S
TR1		07016492	CHIP TRANSISTOR 2SA1649Z*	1		S
TR2		07013381	CHIP TRANSISTOR 2SA1338-67*TA	1		S
TR3		07238754	CHIP TRANSISTOR 2SC3875S-G*AL	1		
TR4		07011793	CHIP TRANSISTOR 2SA1179M6-STR	1		
TR5		07113591	TRANSISTOR 2SB1359	1		S
TR6-7		07320101	TRANSISTOR 2SD2010	2		
TR8		07238754	CHIP TRANSISTOR 2SC3875S-G*AL	1	TSP242/242-24	
TR9		07238754	CHIP TRANSISTOR 2SC3875S-G*AL	1		
TR10		07011793	CHIP TRANSISTOR 2SA1179M6-STR	1		
ZD1					NOT MOUNTED	
DSW1	*1	09090034	DIP SWITCH KSS08-1	1		
	#1	09090068	DIP SWITCH 210B008MS	1		
DSW2	*1	09090033	DIP SWITCH KSS04-1	1		
	#1	09090039	LEAF SWITCH LSA1119H	1		
SW1-2		09010055	PUSH SWITCH SKHHLN	2		
LED1-2		08300136	LED SLZ-390B	2		
XTAL1		09250064	CERA. OSCILLATOR EF0-EX1605X4	1		
C1		05751045	CERA. CAPA. CHIP 0.1UF 50V	1		
C2-3		05752236	CERA. CAPA. CHIP 0.022UF 50V	2		
C4		05751045	CERA. CAPA. CHIP 0.1UF 50V	1		
C5		05752236	CERA. CAPA. CHIP 0.022UF 50V	1		
C6-8		05751045	CERA. CAPA. CHIP 0.1UF 50V	3		
C9		05054745	CHEM. CAPA. 0.47UF 50V	1		
C10-11		05751045	CERA. CAPA. CHIP 0.1UF 50V	2		
C12		05751025	CERA. CAPA. CHIP 1000PF 50V	1		
C13-17		05751045	CERA. CAPA. CHIP 0.1UF 50V	5		
C18-22		05051054	CHEM. CAPA. 1UF 50V	5		
C23-24		05752236	CERA. CAPA. CHIP 0.022UF 50V	2		
C25-26		05751045	CERA. CAPA. CHIP 0.1UF 50V	2		
C27		05752236	CERA. CAPA. CHIP 0.022UF 50V	1	TSP242/242-24	
C28-31		05751045	CERA. CAPA. CHIP 0.1UF 50V	4	TSP242/242-24	
C32		05751045	CERA. CAPA. CHIP 0.1UF 50V	1		
C33		05751045	CERA. CAPA. CHIP 0.1UF 50V	1	TSP242/242-24	
C34-35		05751045	CERA. CAPA. CHIP 0.1UF 50V	2		

## Main Logic Board

DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
C36-41					NOT MOUNTED	
CRA1-3		06542211	RESIS. ARRAY CHIP V8V221J	3		
CRA4-8		06544711	RESIS. ARRAY CHIP V8V471J	5		
CRA9-10		06542211	RESIS. ARRAY CHIP V8V221J	2		
D1-2		08000047	DIODE CHIP DCB010	2		
D3		08000068	DIODE CHIP MC2836	1		
D4-5		08000059	DIODE CHIP MC2840	2		
D6					NOT MOUNTED	
D7-9		08000091	DIODE DSM1SD2*A	3		
DT1		07603017	DIGITAL TRANSISTOR FN1A4P	1		
DT2-4		07603016	DIGITAL TRANSISTOR FA1A4P	3		
DT5		07603017	DIGITAL TRANSISTOR FN1A4P	1		
DT6		07603016	DIGITAL TRANSISTOR FA1A4P	1		
DT7		07603017	DIGITAL TRANSISTOR FN1A4P	1		
DT8-9		07603016	DIGITAL TRANSISTOR FA1A4P	2		
DT10-11		07603017	DIGITAL TRANSISTOR FN1A4P	2		
DT12		07603016	DIGITAL TRANSISTOR FA1A4P	1		
DT13		07603017	DIGITAL TRANSISTOR FN1A4P	1	TSP242/242-24	
DT14		07603017	DIGITAL TRANSISTOR FN1A4P	1		
DT15		07603016	DIGITAL TRANSISTOR FA1A4P	1		
DT16		07603017	DIGITAL TRANSISTOR FN1A4P	1		
L1-6		09990730	BEADS INDUCTOR BK2125HS601	6		
L7		09990725	BEADS INDUCTOR RIB-6-6-C-C8	1		
L8-10		09990730	BEADS INDUCTOR BK2125HS601	3		
L11-17		06750004	CHIP RESISTOR 0 OHM 1/10W	7		
L18-20		09990730	BEADS INDUCTOR BK2125HS601	3		
VR1		06451035	RP RESISTOR RH0614C-10K	1		
RA1		06584729	RESIS. ARRAY 4.7K-OHM 1/8W 8EL	1		
RA2		06581824	RESIS. ARRAY 1.8K-OHM 1/8W 6EL	1		
R1-3		06754711	CHIP RESISTOR 470 OHM 1/10W	3		
R4-7		06753324	CHIP RESISTOR 3.3 K-OHM 1/10W	4		
R8-9		06751031	CHIP RESISTOR 10 K-OHM 1/10W	2		
R10-14		06754711	CHIP RESISTOR 470 OHM 1/10W	5		
R15-17		06751031	CHIP RESISTOR 10 K-OHM 1/10W	3		
R18		06754711	CHIP RESISTOR 470 OHM 1/10W	1		
R19-20		06752215	CHIP RESISTOR 220 OHM 1/10W	2		
R21		06754711	CHIP RESISTOR 470 OHM 1/10W	1		
R22-23					NOT MOUNTED	
R24		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R25		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	1		
R26		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R27		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	1		
R28		06752215	CHIP RESISTOR 220 OHM 1/10W	1		
R29		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	1		
R30		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R31		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	1		
R32		06751824	CHIP RESISTOR 1.8 K-OHM 1/10W	1		
R33		06753334	CHIP RESISTOR 33 K-OHM 1/10W	1		
R34		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R35-39		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	5		
R40		06751525	CHIP RESISTOR 1.5 K-OHM 1/10W	1		
R41		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R42		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R43	*1	06753314	CHIP RESISTOR 330 OHM 1/10W	1		
	#1	06751014	CHIP RESISTOR 100 OHM 1/10W	1		
R44		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		



## Main Logic Board

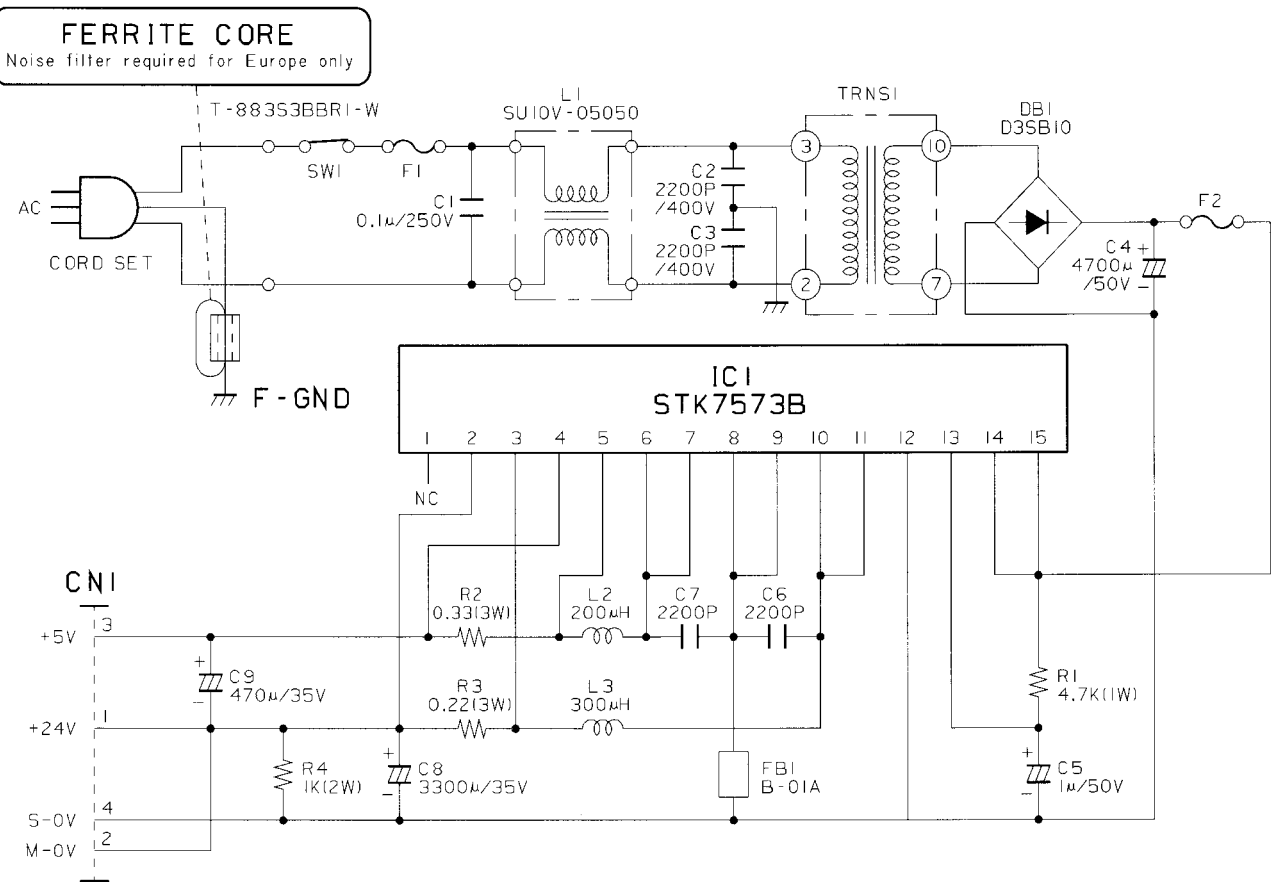
DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
R45-53		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	9		
R54		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R55		06751014	CHIP RESISTOR 100 OHM 1/10W	1		
R56-58		06754711	CHIP RESISTOR 470 OHM 1/10W	3		
R59		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R60-61		06751031	CHIP RESISTOR 10 K-OHM 1/10W	2		
R62-63		06754711	CHIP RESISTOR 470 OHM 1/10W	2		
R64		06752215	CHIP RESISTOR 220 OHM 1/10W	1		
R65-67		06754711	CHIP RESISTOR 470 OHM 1/10W	3		
R68-70					NOT MOUNTED	
R71		06754711	CHIP RESISTOR 470 OHM 1/10W	1		
R72		06753334	CHIP RESISTOR 33 K-OHM 1/10W	1		
R73		06754711	CHIP RESISTOR 470 OHM 1/10W	1		
R74		06752031	CHIP RESISTOR 20 K-OHM 1/10W	1		
R75-76		06751021	CHIP RESISTOR 1 K-OHM 1/10W	2		
R77-80		06754711	CHIP RESISTOR 470 OHM 1/10W	4		
R81		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R82		06753324	CHIP RESISTOR 3.3 K-OHM 1/10W	1		
R83		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R84		06753334	CHIP RESISTOR 33 K-OHM 1/10W	1		
R85-86		06751014	CHIP RESISTOR 100 OHM 1/10W	2		
R87-88		06751031	CHIP RESISTOR 10 K-OHM 1/10W	2		
R89		06751041	CHIP RESISTOR 100 K-OHM 1/10W	1		
R90-91		06751031	CHIP RESISTOR 10 K-OHM 1/10W	2		
R92		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R93		06753324	CHIP RESISTOR 3.3 K-OHM 1/10W	1		
R94-95		06751014	CHIP RESISTOR 100 OHM 1/10W	2		
T96-98		06751031	CHIP RESISTOR 10 K-OHM 1/10W	3		
R99		06751041	CHIP RESISTOR 100 K-OHM 1/10W	1		
R100-101		06751031	CHIP RESISTOR 10 K-OHM 1/10W	2		
R102		06752725	CHIP RESISTOR 2.7 K-OHM 1/10W	1		
R103-105		06751031	CHIP RESISTOR 10 K-OHM 1/10W	3		
R106		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R107		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R108		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R109		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R110		06752031	CHIP RESISTOR 20 K-OHM 1/10W	1	TSP242/242-24	
R111		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R112		06754721	CHIP RESISTOR 4.7 K-OHM 1/10W	1		
R113-114		06753324	CHIP RESISTOR 3.3 K-OHM 1/10W	2	TSP242/242-24	
R115-116		06751534	CHIP RESISTOR 15 K-OHM 1/10W	2	TSP242/242-24	
R117-123					NOT MOUNTED	
R124		06751031	CHIP RESISTOR 10 K-OHM 1/10W	1		
R125					NOT MOUNTED	
R126		06751021	CHIP RESISTOR 1 K-OHM 1/10W	1		
R127		06753334	CHIP RESISTOR 33 K-OHM 1/10W	1		
R128		06753324	CHIP RESISTOR 3.3 K-OHM 1/10W	1		
R129-133					NOT MOUNTED	
BZ1		45060201	BUZZER QMB-111P	1		
CN1		09100270	CONNECTOR 5483-02A	1		
CN2		09100516	CONNECTOR 53014-0510	1		
CN3		09100460	CONNECTOR 53014-0310	1		
CN4		09100582	CONNECTOR 57GE-40360-751	1		
CN5		09100664	CONNECTOR 6216-024-000	1		
CN6		09100665	CONNECTOR 17JE-13090-37	1		
CN7		09100267	CONNECTOR 5483-06A	1		

## Main Logic Board

DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
CN8		09100567	CONNECTOR 95003-2661	1		
CN9		09100038	CONNECTOR 5045-05A	1	TSP242/242-24	
CN10		09100317	CONNECTOR 5483-04A	1		
CN11					NOT MOUNTED	

## 6. Power Supply Unit (120VAC/230VAC)

### 6-1. Circuit Diagram



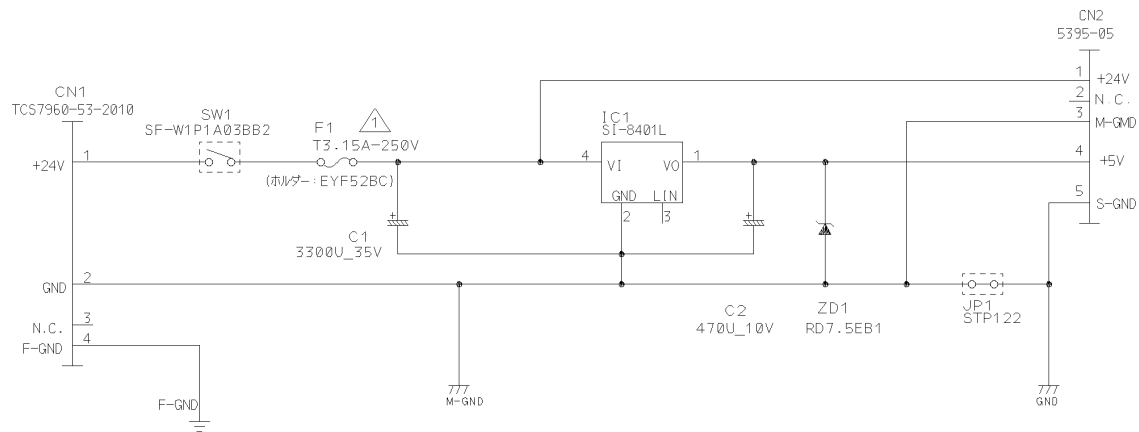
## 6-2. Parts List

### Power Supply Unit(120VAC/230VAC)

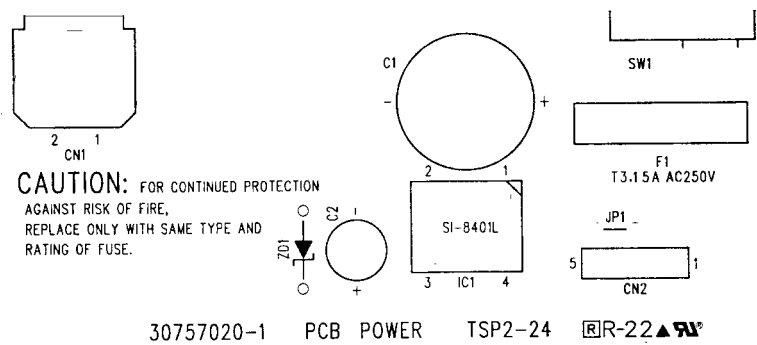
DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
IC1		08202025	IC-REG 7573B	1		
DB1		08990227	DIODE STACK D3SB20	1		
R1		06214721	RN RESISTOR 4.7 K-OHM 1W	1		
R2		06230031	RN RESISTOR 0.33 OHM 3W	1		
R3		06230021	RN RESISTOR 0.22 OHM 3W	1		
R4		06201022	RN RESISTOR 1 K-OHM 2W	1		
C1		05291045	FILM CAPA. 0.1UF 275V	1		
C2-3		05192224	CERA. CAPA. 2200PF 400V	2		
C4		05054782	CHEM. CAPA. 4700UF 50V	1		
C5		05051058	CHEM. CAPA. 1UF 50V	1		
C6-7		05152223	CERA. CAPA. 2200PF 50V	2		
C8		05043385	CHEM. CAPA. 3300UF 35V	1		
C9		05044771	CHEM. CAPA. 470UF 35V	1		
SW1	*1	09030026	SEESAW SWITCH T-883S3BBR1-W	1		
	#1	09030036	SEESAW SWITCH SF-W1P1A03BB	1		
L1		09251106	LINE FILTER SU10V-05050	1		
L2		09251037	CHOKE COIL NM-1-200	1		
L3		09251036	CHOKE COIL NM-16-300	1		
F1		09990058	FUSE 5TT1A 250V	1	FOR US	S
		09990021	FUSE EAWK630MA 250V	1	FOR EC,UK	S
F2		09991011	FUSE 5TT3A 250V	1	FOR US,UK	S
		09990050	FUSE EAK3.15A 250V	1	FOR EC	S
FB1		09990706	BEADS INDUCTOR B-01AT	1		
CN1		80703850	CABLE UNIT 4X120TT SP300II	1		
TRNS1		30780010	TRANSFORMER 120V SP200 US	1	FOR US	
		30780030	TRANSFORMER 230V SP200 EC	1	FOR EC,UK	
-	*1	09110090	CORD SET US-PN SP300	1	FOR US	
	#1	09110158	CORD SET US-PN L=1.8M SP3	1	FOR US	
		09110129	CORD SET EC-PN SP300II	1	FOR EC	
		09110067	CORD SET UK-PN LC	1	FOR UK	
		04991204	FASTENER T18S	1	FOR US	
		04991204	FASTENER T18S	2	FOR EC,UK	
		82911071	RADIATION PLATE SP312	1		
		01903087	SCREW TAT 3-14	2		
		09990023	FUSE HOLDER UF-0033	4		
		09990708	FERRITE CORE ESD-R-16C	1	FOR EC,UK	
		09992307	HEAT-SHRINK TUBE F2-18X30	1	FOR EC,UK	

7. Power Supply Unit (24VDC)

7-1. Circuit Diagram



7-2. Component Layout

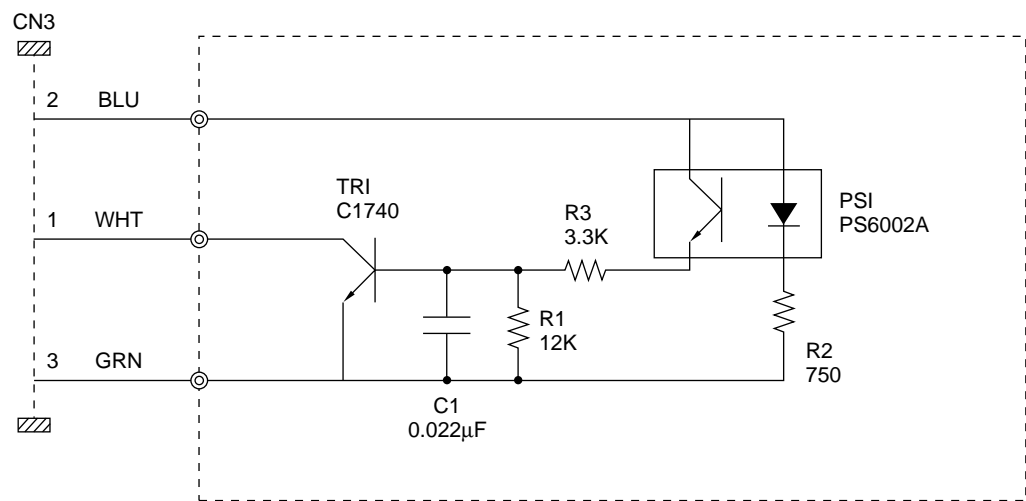


7-3. Parts List

Power Supply Unit(24VDC)						
DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
IC1		08202048	IC-REG SI-8401L	1		
ZD1		08020090	ZENER DIODE RD7.5EB1T	1		
C1		05043387	CHEM. CAPA. 3300UF 35V	1		
C2					NOT USED	
C3		05014775	CHEM. CAPA. 470UF 10V	1		
SW1		09030036	SEESAW SWITCH SF-W1P1A03BB	1		
F1		09991011	FUSE 5TT3A 250V	1		
		09991024	FUSE HOLDER EYF52BC	2		
CN1		09100636	CONNECTOR TCS7960-53-2010	1		
CN2		30720080	CABLE UNIT 4X200CC SP23	1		
JP1		93930006	JUMPER WIRE STP122	1		
-		09991910	S/N SEAL KEI-802	1		

8. Paper Near-End Sensor

8-1. Circuit Diagram



8-2. Parts List

DRWG.NO.	REV.	PARTS NO.	PARTS NAME	Q'TY	REMARKS	RANK
TR1		07227853	TRANSISTOR 2SC1740SE	1		
PS1		08300082	PHOTO-INTERRUPTER PS6002A-KS	1		
R1		06051235	RD RESISTOR 12 K-OHM 1/6W	1		
R2		06057514	RD RESISTOR 750 OHM 1/6W	1		
R3		06053324	RD RESISTOR 3.3 K-OHM 1/6W	1		
C1		05532234	CAPACITOR 0.022UF 25V	1		
-		30721241	CABLE UNIT 3X270C TSP2	1		





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